1956 NATIONALS STORY—Radio-Controlled Submarine

MODEL AIRPLANE NEWS

NOVEMBER 1956—35 CENTS

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POWERS NEW SPEED RECORD!

★ **JAMES PAYSON**

turns 148.09 MPH for New B Record
and First Place at Nationals

★ **DALE BIGGS**

turns 111.62 MPH to win
Proto Speed Event

Fox 29R — the World's Most Powerful Racing Motor.

★

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TOOL AND DIE MAKERS
OFFICE MANAGER
MEN OF EXCEPTIONAL ABILITY
WRITE DUKE M. FOX

SMART CHAMPIONS CHOOSE FOX

The full possibilities of the Fox 29R have still not been fully utilized. Watch for even greater performance records with this motor in the future. Fox sponsors no contestants. The winners bought their motors on the open market.

A new, improved cylinder head has been developed for the 29R. Owners of this model may send in their old 29R cylinder head and receive a new type head, without cost.

FOX MANUFACTURING CO., Inc.
Designers and Manufacturers of the World's Finest Model Airplane Motors
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You'll Say "IT'S THE MOST"!

DESIGNED FOR RADIO CONTROL

LENGTH 50", BEAM 7" ACTUAL PHOTOGRAPH OF MODEL BUILT FROM KIT

Kit B-18M

$14.95

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AMERICAN SCOUT

A Completely Prefabricated Scale Model Power or Showcase Boat.
Longest, Most Detailed Boat Model Ever!

Never before has any model been so breathtaking in its overpowering size . . . : strict fidelity to scale . . . authentic details . . . complete prefabrication . . . and amazing versatility and adaptation to power and radio control operation.

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Philadelphia 44, Pa.

DELUXE 339-pc. FITTING SET B-18F $9.95
Contains cast metal and plastic fittings, single and double plastic blocks.

May be powered with electric motor or gasoline engine with a displacement from .049 to .19.

NEW!---IMPROVED!

THE NEW IMPROVED 1957 SERIES OF ESSCO-LORENZ RECEIVERS NOW AVAILABLE

FEATURES

SUBMINIATURE in size, 2x2½ x 1½, wt. 2 oz.—A GIANT in performance . . . Crash damage resistant. Housed in TUTONE plastic case—Sensitive long reliable range at low cost. Exclusive UNIQUE 2nd stage eliminates "creeping" & relay chatter. Low B battery drain allows all season operation with a set of batteries. 1st stage idle .1 ma with transistor 2nd stage—.2 ma idle with selenium cascaded diode 2nd stage. It is our considered opinion that this new series of receivers OUTCLASS, OUT-PERFORM all similar sets on the market, and AT A PRICE THAT EVERYONE CAN EASILY AFFORD.

Model R51CD with built-in GEM or PRICE relay **$21.95**
Model R61LZA includes GEM or PRICE relay with new type RAYTHEON TRANSISTOR 2nd stage **21.95**
Model R41ND, non diode model, .5 ma idle includes built-in E D relay **17.95**

THE ULTIMATE IN RELIABILITY

Model R51CDS with built-in SIGMA 26F relay **24.95**

We designed a special control panel as a companion unit for this new series of receivers (and others too). Consists of 2 submin control pots & closed circuit metering jacks, DP slide switch & 7 pin jack for receiver plug termination. All housed in TUTONE plastic case as used in receivers. Prevents equipment failure due to dirt, fuel spill-over & splash-proof for boat installations. It's a "cinch" to install RC in model with this exclusive ESSCO CONTROL PANEL.
Wired and ready for use **4.95**
SPECIAL, if purchased with receivers, only **3.00**

SPECIAL NOTE: Components used in these new & all other ESSCO products are the finest first grade money can buy. ELMENCO SILVER MICA condensers in input circuit guarantees non-drift sectivity. CENTRALAB MINI-CERAMICS for long trouble-free performance. Special ESSCO SELENIUM CASCADED DIODES for stable operation in all weather & temperature changes. Printed Circitry is not used for simple reason that the only wiring is for A & B battery leads. All compon.nts directly interconnected. Our "old fashioned" method has proved to be the most reliable & trouble-proof in thousands of installations. AS we see it PC would only save money in production. Since ESSCO RC products are not mass produced we feel we can put out a superior product using our time proved methods.

NEW!! AND OUTSTANDING

THE NEW MAC JR XMTR as described in September YM **DELUXE PARTS KIT** includes all specified items (except 2V cell & meter) of 1st grade materials **24.95**
With drilled-preassembled case & chassis **29.95**
Factory wired-tested—ready for use **44.95**
(includes the NEW ESSCO ANT-TUNER-FSM INDICATOR)

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A small liteweight unit. Uses the McENTEE-GOOD multivibrator circuit with 2 subminiature tubes. 100% precision parts used for reliable proportional control. Factory wired-tested **19.95**

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THE ESSCO-LORENZ with **MINI-PULSER.** A hand held 3 watt MOPA MTR with selfcontained Proportional Control Pulser. You no longer require 3 hands for operating the ultimate in R/C MTRS **39.95**

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THE ESSCO SUPER COMBO PKG. For beginners and old timers too. A low cost high quality R/C outfit. Guaranteed to give reliable, long range control of models. All new 1st grade materials. Alum. XMTR case, 6½ ft. sectional rod antenna. Receiver is a STD ESSCO-LORENZ TWIN TUBER of extreme reliability. XMTR is 3 watt MAC II JR with exclusive ESSCO ANTENNA TUNER INDICATOR which eliminates need of MA tuning meter. Hundreds sold, all acclaimed by 100% satisfied users. We may not have the lowest cost pkg. but we guarantee that the ESSCO SUPER COMBO PKG. is your top buy in a reliable R/C outfit.
FACTORY WIRED **$29.95**; IN KIT FORM **19.95**

BUILD YOUR OWN DEPENDABLE SERVO OR ACTUATOR

Your most dependable source for the English MIGHTY MIDGET ELECTRIC MOTOR, with gear train **2.95**; Replacement brushes, pr. **$0.50**; Spare gears, pr. **$0.75**; MOTOR with spare brushes & gears **3.95**

THE BEST IN RC COMPONENTS

SLIDE SWITCHES, KNIFE CONTACT TYPE
SPST .20 SPDT .25 DPST .25 DPDT .30

TOGGLE SWITCHES, BAT HANDLE
SPST .35 SPDT .45 DPST .45 DPDT .60

CABLE CONNECTORS, MINIATURE TYPE
2-4 or 5 pin plug & socket .15 W/shields. ..... .30
7 pin plug & socket with rubber shield ..... .45

PHONE PLUGS—JACKS
STANDARD PLUG .45 SUB-MINIATURE .65
CLOSED CIRC. JACK .45 SUB-MINIATURE .45

ESSCO - NEW YORK	BUY ESSCO RC PRODUCTS	ESSCO - WEST COAST
58 WALKER STREET	at your local dealer	P.O. Box 325
NEW YORK 13, N. Y.	PROMPT-FRIENDLY SERVICE	Menlo Park, California

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Contest Calendar

Enter or visit these meets. Talk shop with fellow hobbyists. Write CD's for info.

7—*Tulare, Calif.* Class AA Central Valley Annual Free Flight Meet for FFG and TLG. Don Peacock, C.D., 912 Apricot, Tulare, Calif.

7—*Harvey Ill.* Class A R/C[3] Flying Meet for RC. Restricted to members of Radio Control Club of Chicago. R. E. Webb, C.D., 1621 E. 87th St., Chicago, Ill.

7—*Detroit, Mich.* Class AA 1st Fall Flying Fair for TR and proto speed. Warren E. Bartlett, C.D., 14515 Asbury Park, Detroit 27, Mich.

7—*Deer Park, L.I., N. Y.* Class AAA Long Island Championships for FFG, OHLG, PL, PL Jet and RC spot landing. Fred J. Otten, C. D., 525 Ocean Point Ave., Cedarhurst, N. Y.

14—*Inglewood, Calif.* Class AA Skywolves' Team Race. Don C. Crystal, C.D., 805 E. Palmer Ave., Compton, Calif.

14—*Hartford, Conn.* Class AA Greater Hartford Fall Radio Control Contest. Robert H. Haines, C.D., 109 8th St., Newington, Conn.

14—*Phoenix, Ariz.* Class AA Harry Duick Memorial Model Airplane Contest for RC, OHLG, FFG, OR and TLG. Quentin T. Webster, C.D., 521 E. Camelback, Phoenix, Ariz.

21—*Tulare, Calif.* Tulare Sky Kings Record Trials for all free flight classes. Don Peacock, C.D., 912 Apricot St., Tulare, Calif.

28—*Fresno, Calif.* Fresno Gas Model Record Trials for FFG. Jim Scheidt, C.D., 2225 Brown, Fresno, Calif.

28—*Inglewood, Calif.* Class AA Skywolves' Combat Meet for CLC. Don C. Crystal, C.D., 805 E. Palmer Ave., Compton, Calif.

NOVEMBER

4—*Dallas, Tex.* Class AA Cliff Model Club 4th Quarterly Contest for FFG. Joel B. Hargis, C.D., 1102 W. Saner Ave., Dallas, Tex.

11—*Inglewood, Calif.* Class AA Skywolves' Team Race. Don C. Crystal, C.D., 805 E. Palmer Ave., Compton, Calif.

18—*Tulare, Calif.* Tulare Sky Kings Record Trials for all classes of free flight. Don Peacock, C.D., 912 Apricot St., Tulare, Calif.

25—*Fresno, Calif.* Fresno Gas Model Record Trials for FFG. Jim Scheidt, C.D., 2225 Brown, Fresno, Calif.

DECEMBER

2—*Phoenix, Ariz.* Class AA 3rd Model Rodeo for FFG, CLS, CLC, RC and combined OR-TLG Quentin T. Webster, C.D., 521 E. Camelback, Phoenix, Ariz.

9—*Arcadia, Calif.* Class AA Team Racing Contest. Les McBrayer, C.D., 101-B Elm St., Alhambra, Calif.

16—*Tulare, Calif.* Tulare Sky Kings Record Trials for all free flight classes. Don Peacock, C.D., 912 Apricot St., Tulare, Calif.

28-31—*Miami, Fla.* Class AAA 3rd King Orange Internationals for FFG, CLC, OHLG, TLG, OR, CLS, CL, CLFS, RC and rat racing. Charles R. Quick, C.D., 1896 N.W. 36th St., Miami, Fla.

30—*Fresno, Calif.* Fresno, Gas Model Record Trials for FFG. Jim Scheidt, C.D., 2225 Brown, Fresno, Calif.

Here are the WINNERS

1956 NATIONALS DALLAS, TEXAS

Yes, again for the 9th STRAIGHT YEAR famous TOP FLITES and POWER PROPS lead the field at the Nationals . . . Winning MORE 1st and 2nd places THAN ANY OTHER MAKE!

• *choose these famous props and you're flying with a sure winner!*

ALL THOSE LISTED ARE FIRST PLACE WINNERS!

C SPEED JUNIOR
Thomas Kovan
Dallas, Texas
Speed: 136.0 mph
Engine: McCoy 60
Fuel: Home brew
PROP: 9-12 POWER PROP
Plane: Original

COMBAT SENIOR
Bruce Brown
Levelland, Texas
Engine: Torp 35
Fuel: Testor "39"
PROP: 10-6 POWER PROP
Plane: Quicker

NAVY CARRIER JUNIOR
Donald Storner
Belleville, Illinois
249.85 points
Engine: Fox 35
Fuel: Nitro X
PROP: 10-6 TOP FLITE
Plane: J. Roberts Sabre

B GAS FF JUNIOR
Dennis W. Alford
San Diego, Calif.
Time: 14:01.0
Engine: Johnson 29
Fuel: Ohlsson 200
PROP: 10-3½ TOP FLITE
Plane: Sandy Hogan

NAVY CARRIER SENIOR
Glen A. Magree
Cleveland, Ohio
307.16 points
Engine: Fox 59
Fuel: Own mix
PROP: 10-8 POWER PROP
Plane: Bearcat

R.O.W. GAS SENIOR
Lee Hines
Torrance, Calif.
Time: 10:15.0
Engine: Thermal Hopper
Fuel: Thimble Drone Racing
PROP: 6-3 PLASTIC TOP FLITE
Plane: Ramrod 250

RADIO CONTROL (MULTI)
Howard Bonner
Los Angeles, Calif.
197.5 points
Engine: Fox 35
Fuel: K&B 100
PROP: 11-6 TOP FLITE
Plane: Original

PROTO SPEED JUNIOR
Jere Draper
Cleveland, Ohio
Sp: 96.42 (New Record)
Engine: McCoy 29
Fuel: Home brew
PROP: 8-8 POWER PROP
Plane: Veco Redskin

FLYING SCALE CL JUNIOR
Wm. Bryant Brown
Louisville, Ky.
159 points
Engine: K&B 35
Fuel: Exothermic 28
PROP: 10-6 TOP FLITE
Plane: Ju 87B Stuka

FLYING SCALE CL JUNIOR
Jimmie McCroskey
Fort Worth, Texas
303 points
Engine: K&B 29
Fuel: K&B 100
PROP: 9-5 TOP FLITE
Plane: Mustang (orig.)

C GAS FF JUNIOR
Dennis W. Alford
San Diego, Calif.
Time: 12:50.7
Engine: Johnson 35
Fuel: Ohlsson 200
PROP: 10-5 TOP FLITE
Plane: Sandy Hogan

AM. CL. PAA LOAD OPEN
Willard Blanchard, Jr.
Hampton, Virginia
Time: 11:39.4
Engine: Thermal Hopper
Fuel: Thimble Drone Racing
PROP: 6-3 TOP FLITE
Plane: Payee

HELICOPTER
Parnell Schoonky
Kirkwood, Missouri
144.1 points
Engine: Atwood Sig.
Fuel: Nitro XX
PROP: 6-3 TOP FLITE
Plane: Original

STUNT JUNIOR
Dennis W. Alford
San Diego, Calif.
299.5 points
Engine: Johnson 35
Fuel: Home brew
PROP: 10-5 TOP FLITE
Plane: Thunderbird

A GAS FF JUNIOR
Gene Boyd
Los Angeles, Calif.
Time: 12:22.0
Engine: K&B 19
Fuel: K&B 100
PROP: 9-4 TOP FLITE
Plane: Original

R.O.W. GAS JUNIOR
Dennis W. Alford
San Diego, Calif.
Time: 10:28.7
Engine: Johnson 35
Fuel: Ohlsson 200
PROP: 10-5 TOP FLITE
Plane: Sandy Hogan

RC (RUDDER) JR.-SR.
Gerald Nelsen
San Leandro, Calif.
83 points
Engine: Fox 19
Fuel: Blue Blazer
PROP: 11-4 TOP FLITE
Plane: Live Wire Cruiser

B GAS F. F. OPEN
Richard McGrath
Long Beach, Calif.
Time: 28:35.1
Engine: Johnson 29
Fuel: Ohlsson 200
PROP: 10-6 TOP FLITE
Plane: Original

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27th Year of Publication

MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

November, 1956 Vol. LV—No. 5

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by William Winter

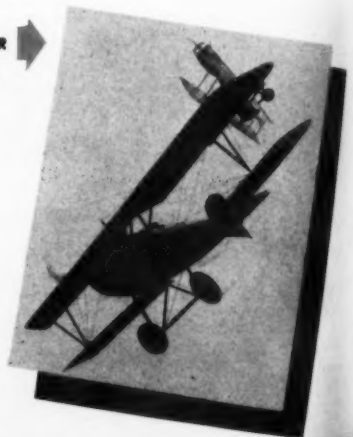
► On August 10, thanks to the Academy of Model Aeronautics, we learned the results of the World Model Championships for Mechanical Motor Models. In another of those sudden-death fly-offs, after a three-way tie, the proxy-flown model of America's Larry Conover placed third to Don Draper and Dave Posner of Great Britain, who flew their own models. In case you wonder what MAN at Work is talking about, this is the International Power Competition, or FAI. Sounding as peculiar as the many strange records which FAI recognizes, that Mechanical Motor title presumably insures that no one will toss a glider or release a rubber job in competition with clock springs or compressed air.

Nevertheless, the FAI gas is a tough event, flown by "champions of the champions," which is two levels above most of us. On the sixth or pay-off flight, which comes after the five perfect three's, there is no time limit and it is to be expected that the day and the thermals are a bit on the anemic side. Silveo Lanfranchi, the Swiss wizard of the free flights, who operates out of England these days, got a 4:15 for Larry. Draper and Posner got 5:20 and 4:52 respectively—which gives you the idea. Proxy flying must have been the best with chaps like Lanfranchi doing the honors! Despite the proxy flying handicap—was it really that?—the U.S. took second as a team, behind Johnny Bull.

Nordic is October. Results of the Wakefield must have gone down with the Doria, for as the issue closes, September 1, the seismograph has not even faintly jiggled. What has the Wakefield come to? Once the greatest and most publicized event of the year, the Wakefield has come to be something that only remotely touches a handful of the mad modelers. The Spartan eliminations—and we do not mean a city, Buster, in which wind and rain frequently make winner selection a travesty, don't help in this country. The FAI, with it's aggressive rules changes and subsequent unfortunate retreat, after having aroused international laments (you always get those, anyway, so why get excited?), torpedoed the publicity ship. Then the asinine splitting up of the three great events, Wakefield, FAI Gas (and clock work), and Nordic—(what did they do with control line?), to be held in three widely separated countries, at three different times, spread (*Continued on page 7*)

NEXT MONTH'S COVER

World War I Albatros



PLANE ON THE COVER

Fierce heat and blistering speed are suggested in this fine cover painting of the Lockheed 104A Starfighter by artist Jo Kotula. Powered by GE J-79 engine, the "missile with a man in it," could fly formation with a 16 in. Naval shell. Maximum ceiling is higher than that of any aircraft.

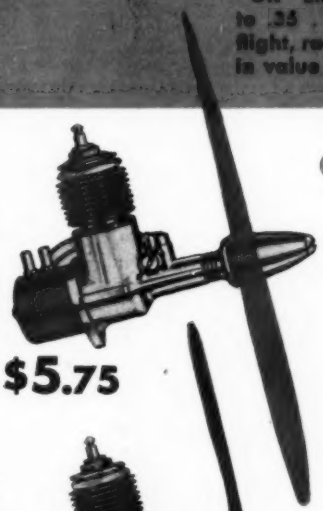
There's a "Cub" Engine for Every Power Application!

Priced from $4.75 to $12.95

"OK" Engines available in a complete series from .049 to .35 . . . all proved champions in control line, free flight, radio control and stunt flying. Top flight champions in value for over 19 years.

CUB .049B

Here's a flashy performer with plenty of power for general flying. Has both radial and lug mountings. It's versatile, comes already assembled. Complete with fuel tank, prop and spinner.



$5.75

CUB .049A

Here's the very latest in this popular series, ideal for both free and control line flight. Mounts flush on the face of the plane, features new lightweight, oversize fuel tank for extra range.

$5.75

CUB .049B POWER KIT

Know your engine . . . assemble it yourself! Learn your engine from the inside out . . . and save $1.00! Includes all the parts and complete instruction for assembling the Cub .049B.

$4.75

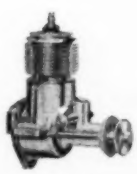
"OK" GLOW PLUGS

"OK" GLOW PLUGS have a superior platinum glow element for fast starts, ease of acceleration, highest speed. Available in two sizes.

59c

"OK" CUB .074 **$5.95**

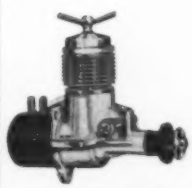
"OK" CUB .099 **$6.95**



"OK" CUB .14 **$7.95**
"OK" CUB .19 **$7.95**

"OK" CUB .29 **$11.95**

"OK" CUB .35 **$12.95**



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.075 **$7.95**

Blended for Long Engine Life and Top Performance . . .

OK GLOW FUEL for Miniature Engines

Specifically developed to give maximum life and performance with all OK engines (and other engines of similar compression ratios). OK Glow Fuel is a scientifically compounded methanol-base fuel, heavily fortified with nitrates. Contains high heat resistant silicone lubricants that won't thin under engine heat. Easy starting. Ideal for breaking-in purposes.

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Atwd. Shriek UC .049 or .051 ea.	5.95
Atwd. Shriek FF .049 or .051 ea.	6.50
Atwd. Sup. Sig. .049 or .051 ea.	6.95
Babe Bee .049	3.95
Cameron Ring or Lapped .19	9.95
Cameron .19 two speed (A)	11.95
Elf Twin .198	21.50
Elf Four .396	45.50
Firecrak's .065 "Thrt'l Ctl."	8.95
Less Throttle Control	7.95
Fox 19 (A) 12.50; 2 Speed	13.50
Fox 29 (B) 15.95; 2 Speed	18.45
Fox 35 (C) 15.95; 2 Speed	18.45
Fox 59 (D) 22.50; 2 Speed	24.00
Fox .29 Racing	27.95
Johnson-Beam or Rad. Mt.- .29	14.95
Johnson- " " " .32	15.49
Johnson- " " " .35	15.95
Johnson- " " " .64	27.50
K & B .099	8.95
K & B Glo Torp 29R. (B)	15.95
K & B Glo Torp 35 (C)	15.95
K & B Torpedo 19 (A)	13.95
K & B .15 (2-speed) (A)	11.95
K & B 19 (2-speed) (A)	16.95
K & B Torpedo 23 (B)	13.95
K & B Torpedo 15 (A)	10.95
McCoy .049 (AA)	3.95
McCoy 9 (A)	7.95
McCoy 19 Super Stunt (A)	7.95
McCoy 29 Super Stunt (B)	7.95
McCoy 36 (C)	7.95
O & R .049 Midget (AA)	5.95
O & R .049 Mite	4.95
O & R Midjet .049, No Tank	4.95
O & R 23 Rv Deluxe (B)	11.95
O & R .29 or .33 Glo ea.	13.95
O & R 60 Glo (D)	14.95
O.K. Cub .049A or .049B ea.	5.75
O.K. Cub .049B Kit (AA)	4.75
O.K. Cub .074 (AA)	5.95
O.K. Cub .074 Phas. (AA)	6.75
O.K. Cub .099 (A)	6.95
O.K. Cub .099 Phas. (A)	7.75
O.K. Cub .14 (A)	7.95
O.K. Cub .19 (A)	8.95
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We meet all competition! If anyone advertises a higher trade-in allowance in this issue, clip the ad and send it to our N.Y. office with your order. BONUS ITEMS INCLUDED AT NO EXTRA CHARGE. Your old engine is worth 25% of the amount of your purchase. Only 1 engine accepted per order.

R.R. #1 .049	5.95
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Space Bug Jr. .049 (AA)	4.15
Spitfire .049 (AA)	4.95
Strato Bug .049 (AA)	5.95
Thermal Hopper (FF) (AA)	6.95
Veco .19	9.95
Veco .29 .31 or .35 ea.	14.95
Wasp (UC) 5.70 (FF)	5.95
Wen-Mac .049 Phas. (AA)	6.95

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McCoy .049 (AA)	7.95
O. K. Cub .075 (AA)	7.95
O. K. Cub .049 (AA)	6.95
Most Imported Makes in Stock	

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(Free Coil, Condenser, Etc. Included)

Forster .99	26.50
O & R 23 RV Deluxe (B)	12.95
O & R .29 Rotary or .33 ea.	14.95
O & R 60 Lure (D)	15.95

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Allyn Mer-Fury .049 (AA)	5.95
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Atwood Inbd. Air Cooled (AA)	5.50
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Atwood Obtd. Wt. Cool. (AA)	9.95
Cameron .09 Marine (A)	9.95
Cameron .09 Marine Dblejet (A)	11.95
Cameron .19 Water Cooled	14.95
Cameron .19 Marine Dblejet	16.95
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Twin .12 Outboard	14.95
Sea Fury Inboard .049 (AA)	9.95
Wen Mac .049 Inboard	7.95
Wen Mac Outboard	9.95
We carry all the Allyn Fury engines	

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Mew 601	1.10
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Jetex 50 — .98 Contest Spl.	1.95
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.09 to .36 HiSpeed Ndl. Valve	.50
Fox 35 Hi Comp. Head	2.00
Thermo Hopper Rad. Mount	.75
K & B Radial Mt. .19, .23, .29	1.00
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All Amer. Stunt 36" A-B	4.95
All Amer. Sr. Stunt 51" B-C	5.95
American Boy 18" .049 to .074	1.00
Arrowjet 24"—.049 to .074	2.50
Baby Barnstormer 23" AA	3.25
Baby Clown 22" AA	1.50
Bambino 24" AA	3.95
Barnstormer 47" A-B	6.50
Bearcat 35" C-D	4.95
Beechcraft 16" AA-A	2.95
Bipe Stunt Train. 22" B-C-D	3.95
Boeing F4B4 17½" AA	2.95
Boeing F4B4 30" .099 to .29	6.50
Boeing P26A 18" AA	2.95
Monoline Jr. 18" .049 to .099	1.95
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Mr. Mulligan 16" .049 to .074	1.00
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Quick Silver 32" .14 to .29	3.50
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Secret Weapon 24" AA-A	1.95
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Smoothie 52" A-B	7.95
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Dakota 24" AA	2.75
Folly 32" AA	1.75
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KIWI 35" AA 2.95; 44" A	4.95
Mini-Hogan 34" - 1.95; 45"	2.95
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Chief 53" B-C	6.95
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Circus King 40" B-C	2.95
Cobra 38" .19 to .35	3.95
Continental 40" A-B	4.95
Corsair 18" .035 to .074	1.19
Corsair 17" A-AA	2.95
Corsair 36" B-C	5.95
Curtis P-40 27"—.099 to .19	1.95
Curtis P40F 20" AA	3.95
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Curtiss Hawk P6E 23¾" A	4.95
Curtiss JN4 - 44" .099 - .35	6.50
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F & B Basic Trainer 25" A-B-C	2.95
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Firecat 42" AA	4.95
Flying Clown 28" A-B-C	1.95
Focke Wolfe 190 17" AA	2.95
Focke Wolfe 190, 16½" .049	1.50
Fokker D8 16½" .049	1.50
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Super Duper Zilch 52" C-D	5.95
Super Puddlejumper 28" AA-A	3.95
Supr. Ringmaster 42" - .19 - .60	3.95
Super Sabre 18" .035 to .074	1.95
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Cessna 170 72" B-C	10.95
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Luscombe Sedan 76" C-D	9.95
Mambo Trainer 48" AA-A	5.95
Monocoupe 64" .19 of .45	11.95
Navion Super 260 - .29 to .65	13.95
No. Am B25, 67" (2) .19 to .33	20.00
Piper Cub J3 71" A-B	8.95
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Fokker D-VII 32½" UC A-B-C	5.95
Fokker D7 14" AA	2.95
Fokker Triplane 14" AA	2.95
Forty-Niner 18" AA	1.95
Good News 30" A-B-C	5.95
Goshawk F11-C2 24" .074 to .15	4.95
Grumman Guardian 50" A-B-C	6.95
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Hawker Typhoon 16½" .049	1.50
Hell-Razor 9" AA	2.00
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Jubilee 40" .19 to .35	3.95
Jupiter 15" .049 to .099	2.50
Jumping Jack 33" A-B-C	2.95
Junior Puddlejumper 19" AA	1.95
Jr. Jetster 20" .049 to .099	1.95
Key-Dot 18" AA-A 2.95 29" B-C	5.95
Knight 36" — .19 to .36	2.95
Lil Duper Zilch 42" A-B	3.95
Lil Half Fast 21" .049 - .074	1.95
Lion Tamer 42" B-C	3.95
Little Ace 18" AA-A	1.95
Little Bipe 16" AA-A	1.50
Little Devil 18" AA-A	1.80
Little Ike 18" - .035 to .074	1.19
Little Mercury 18" AA	1.50
Little Mustang 18" AA	1.95
Little Sabre 18" AA	1.95
Little Spitfire 18" .035 to .074	1.19
Little Stinker 16" AA	2.50
Mentor T-34A 33" A-B	5.95
Messerschmitt 109-27" .09 to .19	1.95
Mini-Whirlaway 8" AA	2.95
Minnow 28" A-B-C	5.95
Mini-Zilch 19" AA	1.25
Minute Man 16" .020 to .049	1.75
Mitchell B-25-(2) .099 to .12	12.95
Monocoupe 36" B-C	4.95
Monocoupe 18" AA	1.50
Monoline Trnr. 36" .19 to .35	3.95
T-28 N.A. Trainer 30" B.C.	5.95
Thunderbird 54" C	8.95
Thunderbolt 40" C-D	4.95
Tom-Tom 40" B-C	3.95
Tomahawk 40" A-B-C	2.95
Trister Improved Trainer	4.50
Trixy 45" .19 to .36	6.95
Typhoon 17" AA	2.95
Vampire 40" B-C	4.50
Vengeance 41" A-B-C	2.95
Venus Flying Saucer 21" to .074	2.50
Viking 51" C-D	8.75
Vitamin 16" AA	1.75
Vixen 21" AA	1.95
Waco 33" B-C	5.95
Waco Cabin 12" AA	1.50
Warhawk 17" AA-A	1.95
Warhawk 32½" B-C	5.95
Warhawk Bert. 45" A-B-C	5.95
Warrior 36" A-B-C	4.95
Wee Duper Zilch 34" AA	2.95
Wee Willie 18" AA-A	1.95
Whirlaway 18" AA	1.50
Woodchopper 32" .19 to .35	2.95
Wow 40" .19 to .35	2.95
Yak (Sterling) A-B-C	2.95
Zero 18" AA	2.95
Zilch 20; 20½" .035 to .074	1.80
Zilch X-Pendable 38" A-B-C	3.95
Royal Rudderbug 62" A	6.95
Sea Cat 68" .15 - .25	7.95
Super Buccaneer 90" C-D	12.95
Taylor cft 9' .35 to .99	17.50

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FREE FLIGHT PLANES & R/C

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Bird Dog 36" FF AA	2.95
Bootstrap 40" AA	2.50
Buhl-Pup 37" — .049	2.95
Cessna 180 35" AA	2.95
Civy Boy 61" A-B-C	7.50
Clipper 34" AA	2.95
Cloud-Captor TR 25" AA	3.50
Cloud-Captor D2 26" AA	2.95
Colonial Skimmer 36" - .049	2.95

ACCESSORIES

PROPELLERS

Tornado	
3 Bladed Props (RH or LH) 6" Diam. 3" Pitch (Pusher)	.20
5" D 3-4-5-6-7-8 P	.20
6" D 2-3-4-5-6-7-8 P	.20
7" D 2-3-4-6-8-9 P	.30
8" D 3-4-5-6-8 P	.30
9" D 3-4-5-6-7 P	.25
10" D 3-5-6 P	.30

METAL GAS TANKS and miscellaneous:

Scamper Plastic 5½" 3p., 6" 4p.	.15
9" 6p., .45 10" 10p., 11" 8p.	.65
Keysun plastic 5/3, 5½/2½, 5½/4, 6/3, 6/4, 6/5, - .15c; 7/3, 7/4, 7/5	.20
Top-Flite—6" in 3,4,5p—20c; 7" in 3,4,6p; 8" in 3½,5,6,8p; 9" in 4,5,6,7,8p; 10" in 3½,5,6,8,12p—25c; 11" in 4,6,8,10,12p; 12" in 5,8p; 13" 5½p. each .30 ... AND ALL OTHERS!	
Top Flite (Plastic) 5¼" 3 or 4 p	.15
6" 3 p or 4 p	.15
Wen-Mac 3 Bladed (RH) 4½" in 3p	.50
Darwin Brass Pee-Wee (⅝" w. ½" h): 1", 1½", 2", 2½" ea.	.50
B (1⅛" w. ¾" h): 1½", 2", 2½", 3" ea.	.75
L (2⅛" w. 1⅜" h): 1½", 2", 2½", 3" 3½", 4" ea.	1.00
Froom: #20 (1" w. ⅝" h): 1¼", 1½", 1⅜", 2⅝" ea.	.65
#21 (2" w. 1" h): 2½", 3", 3½", 4" ea.	.95
Berkeley AA .59; A&B .75; C&D	.85

GLO PLUGS (STATE ENGINE)

McCoy, O&R, K&B, Kwik Start, Veco, Cox, Fury, Wasp or T.D. ea.	.66
O.K. (short or long)	.69
Champion Spark .50, Glo	.75
Wen-Mac 3 Bladed RH 4½" in 3 p	.50

WHEELS

K&B Alum. Hub: 1" — 40c; 1½" 60c; 2" — 80c; 2½"	1.00
Semi Pneumatic (pr) 2"	1.25
2½"—1.40; 3"—1.75	
Sponge Rubber (pr) ⅞"-1" 30c; 1⅛"; 1¼" 38c 1⅜" 40c 1½" 45c; 1⅝"—65c; 2⅜"	.85
Tail Wheels ½"; ⅝"; 1"	.18
Tracler Pneu. (pr) 1¼" or 1½"	.40
1⅞", 2"—50c; 2¼", 2½"—60c; 2¾" 1.00; 3" 1.25; 3½" 1.50	
Pneu. Veco 3½" - 4.95 4½"	5.45
Wheel Collars (Retainers) pr.	.20

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AIRPLANES:

Albatross 6" (Aurora)	.69
Boeing B17G, 19" (Lindberg)	2.49
Corsair 7" (Hawk)	.50
Curtiss Pusher 8" (Hillcrest)	1.25
Douglas DC3, 12" (Monogram)	.98
Fokker D7, 6" (Aurora)	.69
Ford Trimotor 12" (Monogram)	.98
Helicopter S55B, 13" (Revell)	.89
Javelin 9" (Hawk)	.98
Mitchell B25, 13" (Revell)	.98
PBY Catalina 17" (Aurora)	1.98
Stratofort B52, 13" (Revell)	.98
Stratojet B47, 7" (Comet)	.39
Stuka 11½" (Lindberg)	.98
Skywarrior 18" (Allyn)	4.95

BOATS

Btlshp. Missouri 20" (Revell); Chinese Junk 12" (Aurora); Cobra 16" (Sterling); Constitution 19" (Revell); Destroyer 15" (Revell); FDR Carrier 22" (Revell); Freighter C3, 15" (Revell); Guided Missile Sub 13" (Rev); M4 Tank 7" (Revell); P.T. Boat 15" (Lindberg); Tugboat 9" (Revell); USS United States 29" (Ideal); Viking Ship 12" (Aurora); Wasp 20" (Lindberg)

Berkeley (½A) Test Stand	.39
Presto Disc Starter	.25
Pylon Engine Starter 1.95 &	2.50
Fuel-off Timer	1.95
Hillcrest Fuel Shutoff	1.35
Kading Stop-it 1.25; Timit	2.25
Spitfire Timer	2.95
D.E. Shutoff Valve	1.25
Silk per yd.: Red, blue, yel., orng.	1.50
Nylon per yd: White 1.00; Yellow	1.50
Flexible Needle Valves: Cub, Royal Spitfire, Spitzy—49c; Wasp; Baby Spit, Infant, 39c; Universal Needle Valve (A-B-C engines) 50c; Flexible	.75
Needle Valve Extension flexible	.25
Plug Wrench .25; 4 Way Socket	.60
Glue Gun .50 — Plane Kleener	.50
Bolts ½", ¾", 1", 1¼", 1½", 2"	12/.20
⅝" A.M.A. Decals	.10
Scoremarker Decals (100)	.15
Rev-up (Engine Conditioner)	.60
Austin Booster Plug-in	.25
Midget Switch: slide—.25 Toggle	.50

READY-TO-RUN

Complete With Engines

AIRPLANES: Aeromite 17" (Assembled); Bonanza 16" (Assembled); Firebaby 19" - 7.95; Biplane; Firebee (Asmbld. 2 speed); Flight Trainer (Assembled); Flying Circus (Assembled); TD-1 24" (Assembled); Tripacer 17" (Assembled); Turbo Jet 16" (self-starter); Sabre 44 (Assembled)

SPEEDBOATS: Allyn Craft Outbd. w/eng.; Aquamite (with engine); Corvette (Wen-Mac) with eng.; Water Wizard (with engine)

RACE CARS: Automite with Wen Mac Engine; Half-Pint Kit - 2.95; w/ engine; Rodzy Complete with Engine; McCoy with Engine; McCoy Nike Rocket w/Engine; O & R 6.95; with Engine; Prop Rod with Engine

MODEL BOATS

Tug Boat (Veco) 38" B/C; Corvette (Sterling) 48" B/C; Cobra 31½" A-D; Allyncraft 18" Plast. In or Outbd; Flash (Plastic) 17" In or Outbd; Cobra (Dumas) 27"; Chris-Craft Challenger 33" C-D; C.C. Riviera 12½" AA-A; C.C. Catalina 31¼" A-B-C; C.C. Motor Yacht 48" A-B; Sea Dart 16" (Outboard); Sterling C.C. Buc 19" AAA; Sport Fisherman 38"; Crackerbox 18"; Century Seamaid 12" AA; C.C. Cruiser 28" Radio Con. A-B; Sea Bird RC 28" AA-C

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Cavacraft — OUTBOARD CABIN CRUISER — 10" Formed plastic hull. For ½A Inbd. or Outbd. gas or elec. eng. $5.95

U-C ACCESSORIES

BERKELEY control lines .008, .010, .012 - 2'-55'	.50
.008, .010, .012, .014 2-70	.65
Stranded .015, .021 55' 1.00; 70' 1.25; 200'	3.50
PYLON control lines .008 .010 .012 .014 .016; 2-52'	.60
.010, .012, .014, .016 2-70'	.75
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MAN at Work

(*Continued from page* 4)

out the effectiveness of international events like a bottle of microfilm solution in a swimming pool.

The rules situation alone has prevented publication of plans of the models involved and the whole mess has discouraged the traditional story and picture coverages. Outside of what the diligent Peter Chinn may report in Foreign Notes, MAN is not running a coverage this year. How many places can you send a reporter?

The rules foul-up is a crime. It was bad enough that the rules committtee went off half cocked. But it was the considered observation of this magazine that, while the boys were "shook", as we said before, the rules would have been accepted in sporting spirit. In this country, that is. In England, the matter seemed almost to reach to Prime Minister Anthony Eden, although there is nothing improper in trying to right a wrong. Somebody must try. But, nevertheless, FAI was wrong to backtrack. Who, in the future, will dare change those sacred rules? Having opened the door—this is like an umpire, saying forgive me, Mr. Durocher—the whole shooting match is up for grabs. In the future, it is to be hoped that the rules machinery will be redesigned, that poppa FAI will keep an eye on the modeling Junior—and let's think about those eliminations! Let's get this thing back on the tracks.

• • •

Every year, a goodly number of Americans die by accidental electrocution, mostly in the home. Among the numerous freak causes of such deaths, an insignificant few, when you think of the whole picture, is the flying of control line models near power lines. In recent years, about one such death occured about every 18 months. When MAN at Work brought this up at the last meeting of the Aeronautical Section of the Hobby Industry Association, one manufacturer, American Junior, was moved to phone the plant about putting a warning cartoon on their new plans. Scalemaster already has a note in their plan directions. Matty Sullivan, the wire man, had researched the problem with a Philadelphia electric company. These are the facts: the model or the control wires do not have to come in contact with the power lines. For every 1,000 Volts, the current is capable of jumping a one foot gap. If the power lines are of the 22,000 Volt variety, plainly, model fliers have no business in the vicinity. Control lines of other materials are not the answer. Moistened from the hand, or dampened from contact with the ground, they will allow current to reach the flier. Once in flow, the current can jump amazing distances. So Matty reported. Strangely, and until recently, adults have suffered. Kids seem to behave better. Faulty toasters, vacuum cleaners, and many other appliances and electrical items do kill the negligent, but let's not, therefore, accept the notion that at infrequent intervals someone must introduce a model airplane into the act. Stay away from power lines. Way, far away. And spread the word.

• • •

From Vernon Seiler, Evansville, Wisc., a clipping from the Wisconsin State Journal, well worth mentioning for its enlightening report on local modeling activities. It seems that the 54-member Madison Model Airplane Club found a new home at the old Royal Airport. Herman Ring & Sons, contractors, volunteered to plow, disc, and drag an area 200 x 600 feet for flying circles. The anonymous reporter, who tangled manfully with the whole rundown of modeling, deserves a by-line . . . From Paul Burvant, CD, New Orleans, complete results of the Gulf States Model Meet, manned completely by Naval Air Station Personnel. Electric timing of speed events, with underground cable from pylon to control tower, accurate to 1/100 second. Unfortunately, no magazine can publish contest results consistently. A monthly issue would look like the Chicago phone book. . .

• • •

The 25th Nationals are history. There is something very special about any Nats as most entrants find out. It isn't the planes, or the flights so much, as it is a great many more subtle things. This is what the last Nats meant to Ed Burns, of Shawnee, Okla., who had no expectation whatever of finding himself up here on the soap box. This is the way he tells it. . .

"I was lucky enuf to get to Dallas this year and learned some important lessons," Ed begins. "The majority of the people there displayed excellent sportsmanship, but I still noticed the few introverts who make life miserable for themselves—those pros who are 'better than you because my model is ⅛ ounce lighter' or those who are untouchable because 'this is my 5th Nationals and only your 2nd.' The contrast between these people and such friendly people as Dean Kenney, C. O. Wright, Carl Hermes, et al, is enuf to make one want to renounce the hobby. So the first lesson I learned was win or lose, I'll try my best to help the other man all I can.

"The second lesson, was a simple one," Ed goes on. "Know your plane; never fly an untrimmed ship and expect to bring back the hardware." What does the Nats mean to you?

• • •

In these days of an engineering shortage, it is good to reflect on the heavy contribution made by airplane modeling to the aircraft industry and national defense. So commonplace with us, that we take it too much for granted. Famous one-time modelers design aircraft, even own important plants, and engage in every phase of aviation. So, if you would make modeling a stepping stone to a career, you'll need no further justification for the hobby. This reminds us of the story of Richard Whitcomb, inventor of the "wasp waist" or "coke bottle" fuselage shape that allows our new jets to fly as much as 200 mph faster than they would go otherwise. When he was 12, he took over the basement in his Worchester, Mass., home and, as a New York Times reporter said afterwards, emerged reluctantly to eat, sleep, and go to school. Making a model that could fly fascinated Whitcomb, as it did thousands of others who have done something about their interest. Whitcomb, did, nonetheless, go through school and college to become one of the NACA's civilian engineers. Though deeply interested in models, he didn't go overboard, to the exclusion of everything else. No use, young men, of getting yourself flunked or, you Open Class balsa butchers, of having the Mrs. go stalking home to mother!

• • •

"We must bow to progress," declares the Midwest Model Aircraft News, while citing the loss of vacant land, otherwise known as flying sites, to new houses, streets, and factories. This good paper goes on to say that this story must be common throughout the country. Ball diamonds, school yards, and parking lots, would make possible flying sites, thinks MMAN, de-

(*Continued on page* 40)

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the 25th NATIONALS

Come now, boys, it wasn't that close! Can't a man even tilt a stab without all that excitement? Chap covering face really is aiming camera.

Releasing his Wakefield on unassisted take-off, is Otis Goss. An interesting point is the retracting wheelless landing gear strut.

Beautiful water take-off by Fred Salmon, of the USAF team. Half Hogan and half Civy Boy, his plane probably should be a Civyhogan.

On July 23 through 29, the Annual Big Meet was held at the Dallas Naval Air Station. Despite scorching weather, records were broken and good time was had by all.

by PAUL GILLIAM

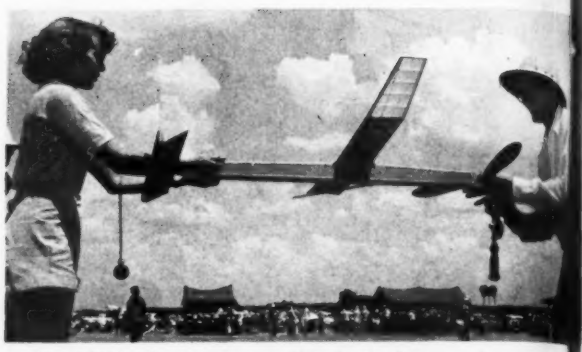
► Year after year the Nationals seem to be better planned and organized and you have to wonder how far can they go before absolute perfection. The U. S. Navy, the personnel of Dallas N.A.S., and our Academy of Model Aeronautics must certainly take a big bow for this truly all-time great meet. This, the 1956 National Model Airplane Championship, was held at the Dallas Naval Air Station, Dallas, Texas, July 23 through July 29, 1956. These were the highlights:

Illinois leads States in out-of-state entries: Many, many modelers from the Chicago area, including the modeler's modeler Carl Goldberg, helped swell the Illinois entry list to 83 contestants. This shows much activity for the Illini lads, considering the home base state of Texas had only 135 entries. California had 80 entrants for second place, with Oklahoma next at 62. The total entries from 43 of the 48 states, Canada, and Mexico settled at 828 at last counting. This means that this great Dallas meet was a dozen or so short of last year's Los Alamitos affair.

Model industry enthusiasm at Dallas: From every prop and balsa size to the smallest rubber band, the Ed Alexander supply concession in the hangar workshop was on hand at all hours to fill the contestants' needs. Fine model industry people like Johnny Brodbeck, K & B Allyn; Hi Johnson, Duke Fox, Johnny Clemmens, and Carl Goldberg were on hand to give a helping hand. Every make of engine seemed to scream its heart out in the humid Dallas air.

Fathers and Sons: We interviewed a dozen father-and-son combinations at work in the hangar shop. This was a

Academy at work: Left to right—Keith Storey, Russ Nichols, Billie Fritchey and Carl Wheeley, shooting pictures from afar. Happy crew!



Really professional team at many Nats is the Conovers, Larry and missus, stop-watch ready. Winding not dangerous—like knife throwing.

Assisted by Hal Cover is Carl Goldberg, flipping new Nimbus. Carl has entered every Nats.

Please, Charles Vincent seems to be saying to his VTOing Class-B free flight. Up she went.

The woman's touch! Remarkable decorations on Dave Eden's stunt jobs were work of Mrs. Eden.

Left—Motor didn't run but plane flew for 90 minutes. Takes form. Above—Speed demon Bill Wisniewski readies for 146:56 record hop.

Gliders, get your gliders here! Hard working Mrs. Wallace totes hubby's hand-launched gliders to flying site. Takes teamwork to win.

wonderful sight to see. In a couple of cases, the fathers were not contesting at all, but had brought their 9 and 10-year old sons to the big meet for a competition try.

I talked to 9-year old Ray Elmore of Aurora, Colo., who was busy at work in the hangar with his dad. Young Elmore said, "Sure hope we do good, 'cause mom gave up her vacation to stay home with the baby so we could come to Texas to fly."

On the way to the flying area, I spotted a typical American model mother. She was carrying an armful of hand launch gliders . . . and leading three healthy youngsters (and they would have to be robust ones to bear the 100 degree Texas heat). She was Mrs. Sophia Wallace, Allen Park, Mich. Mrs. Wallace, her husband and the kids were making it a family Nationals . . . and having fun, too.

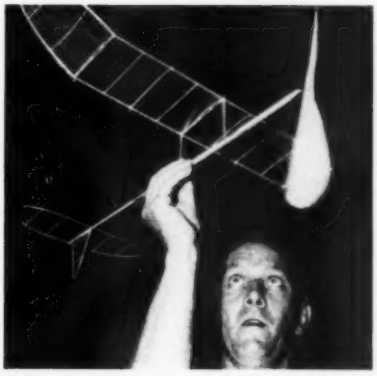
Radio control competition fierce: The radio control ships were fantastic things to behold. It took 197 points to win first place this year against the winning 147 points for last year. Howard Bonner won the Multi-channel event with an outstanding performance on his last flight on the final day of the meet. Dean Kenney lead the Multi pack on the first and second days. Dr. Walter Good lead on the third day with beautiful flying. Dale Root then took over and held the pace until 2 hours of the end of the meet . . . and Bonner's final great performance. Most of the radio ships were very swift in the maneuvers . . . seemed almost over-powered. Harry Young, Detroit, won the rudder-only event in a tie with William O. Hershberger, Arlington, Va. Young had the best second flight.

Ramrods fill the Texas sky: Very few

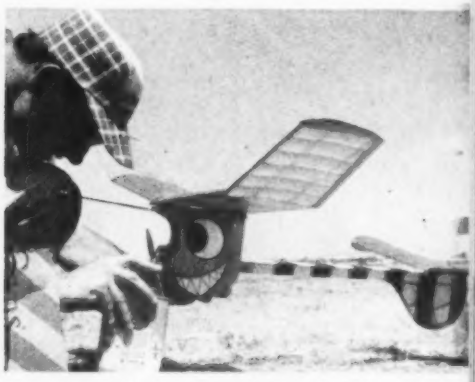
Mr. Helicopter, Parnell Schoenky, cops again. Here he is readying scale-like 'copter for another first place—winning Nationals flight.

Red Hillegas, perennial Nats helper, asks Sal Taibi, left, about his PAA Load International Class winner. Sal's been winning 20 years.

After good ROW flight, veteran flier Lew Mahieu observes event from under a Ramrod.



Indoor master, Joe Bilgri, carefully launches paper-covered stick to another first place.



High, Pops, let's show 'em, chirps a capable original. Antennae balance. By Joe Slovacek.

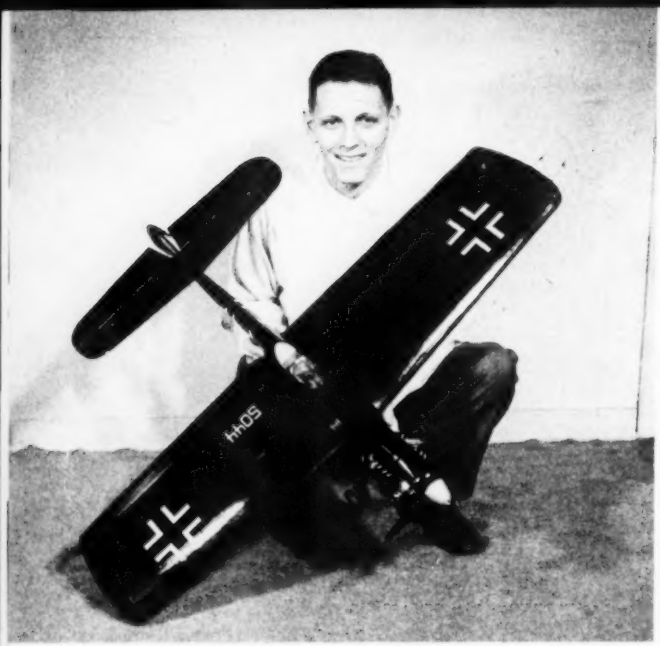
Father and son teams abound. John Nogy and son Lee (8) who took a second with paper stick built in hangar. Lee built it, no question!

Attired like a foreign legionaire in hot sun, Lenny Lortz, holds Nordic entry ready for launching. Thin wing really not on backwards.

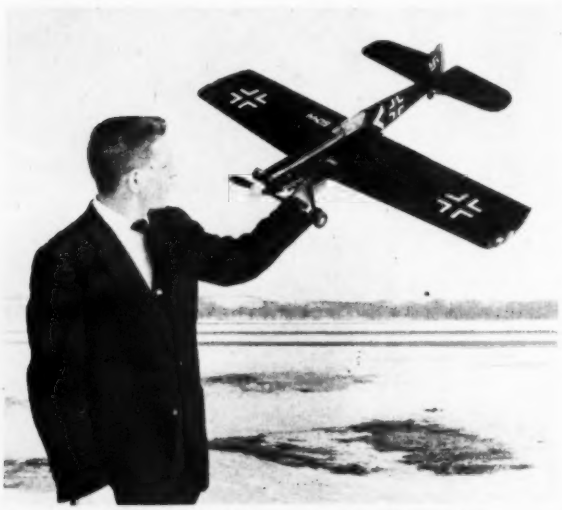
free-flight designs were seen. The Spacers, Kiwis, Zeeks, Fubars, and Civy Boys all had their ups and downs. Some flew well, while others met with the crunching of balsa on hard runways. If any one design can be singled out for performance, it would be the Ramrod. It flew consistently well in all class sizes by junior and open modelers alike. Stable, stable ship. The free flight weather was not as bad as we had expected. On almost every day, there was a light to brisk breeze in the early morning . . . turning to almost a dead calm at noon-time . . . then at mid-afternoon the breeze again. Very few thermals were caught during the noon calms. Seemed all the air coming down.

George Aldrich proves tops in precision stunt: This young man is absolutely great. This event had some really top-notch ships and fliers. We thought we had seen the finest in stunt when Bob Palmer and Malcomb Windham finished their patterns. Then the cool and confident Aldrich calmly picks up the handle to a beautifully porportioned and balanced stunter and gave the crowd (*Continued on page* 62)

Rodney Hoper waits for pop to retrieve a rubber model.



Remembered for his Spitfire Stunter, August '55 MAN, author shows off the Spitter's companion piece and arch foe, the Messerschmitt.



"Minnesota style" 109 got attention at upper midwest meets. Heavier, bigger "Texas style" job not good at that altitude.

ME-109 Stunter

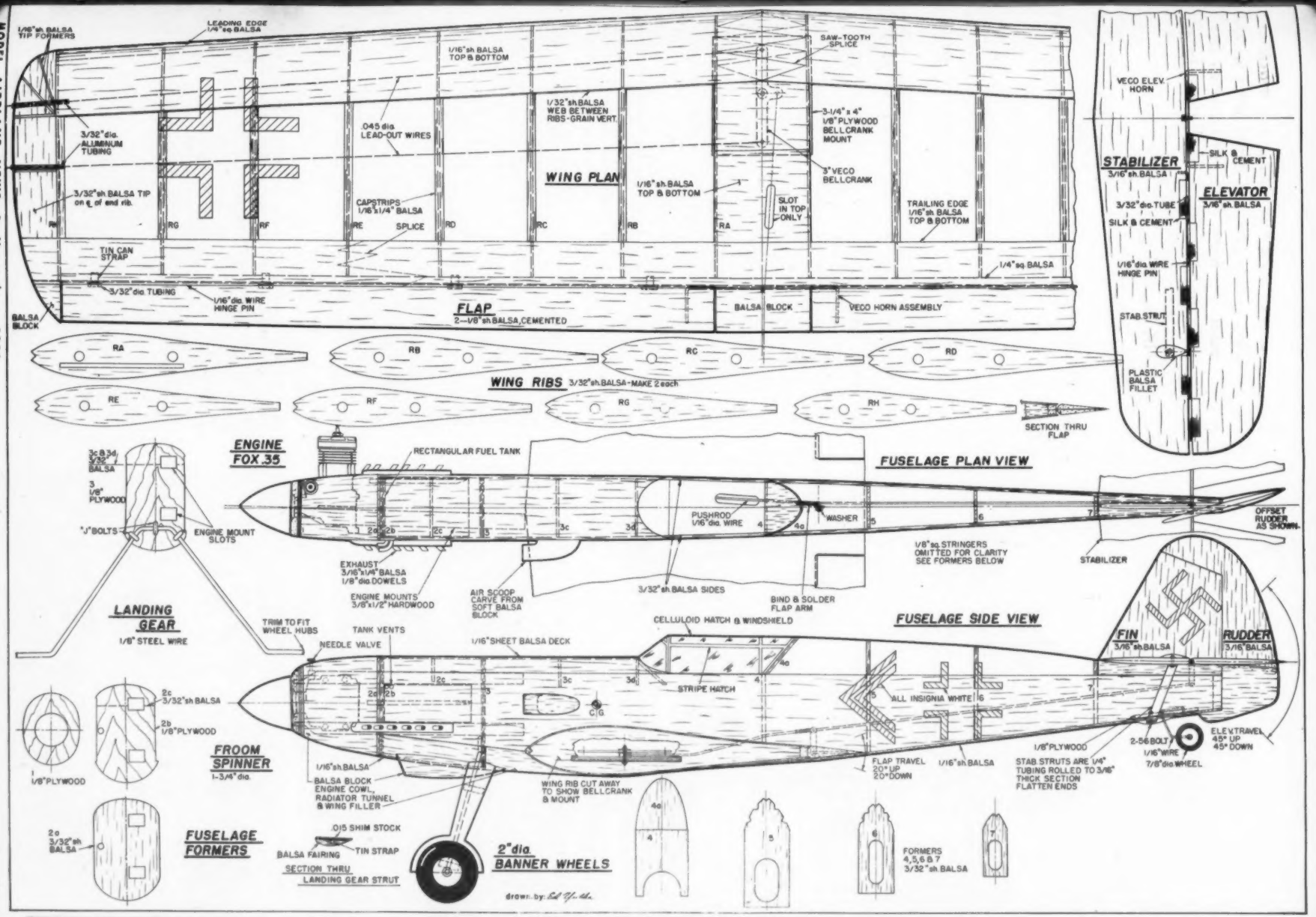
For .29's and .35's this full stunt machine should please the pattern fliers who want their models to look like real crates but who don't want to tackle real scale jobs.

by FRANK B. BAKER

This is a contest stunt plane which has had a long development. The present model is the fifth in a series and has a strong Messerschmitt motif. The original model really was scale, with an enlarged elevator, and stunted very well. In service I was stationed in Houston, Texas where they flew a very different type of plane than we did in Minnesota. While there, I built a "Texas style" ME-109, embodying what I had learned from the stunt men in that state. This version, which weighed 48 ounces, stunted much smoother and slower than the original. Back in Minnesota it did not fly as well as in Texas, due in part to the 2000 feet difference in altitude. A new smaller and lighter plane was built which is the present version. The present plane combines the appearance of the ME-109 with the results of five years of design development. This model has drawn much attention at local meets through the upper midwest.

The construction is simple and light. I always built my tanks into the airplane so be sure to test the tank for leaks. Once in the plane, it is too late. Fill the tank with white gas and soak the tank in gas for a few hours to dissolve any rosin which might be filling small holes. The body construction is standard. The wheel-cover plates are built to stay on. The plate is cut out of shim stock fitted around the ⅛" landing gear wire. The straps are silver soldered to the shim stock and the wire. Fill in the plate with 3/16" balsa and curve to an airfoil shape, then cover with silk. The elevator is built of 3/16" sheet; due to its light weight it must be supported by struts. The ¼" diameter aluminum tubing is run through sheet-metal rollers until 3/16" thick, flattened at the ends, then bolted to the body and elevator. The struts are scale and functional. The elevator hinge is made up of pieces of 3/32" aluminum tubing on 1/16" music wire. The pieces are alternately taped to the elevator and stab, resulting in a trouble-free hinge. The 1/16" (*Continued on page* 40)

Herman, the dummy pilot, and a jet black finish with white decorations point up the sharp looking stunter. Wings flapped and silk covered.

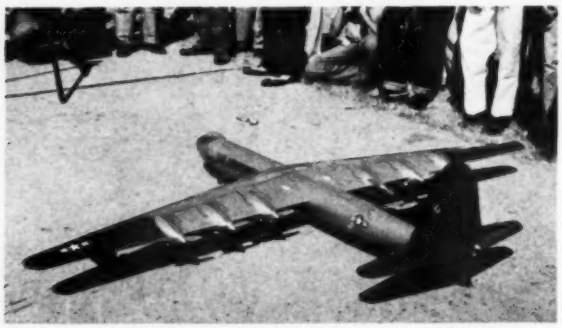


FULL SIZE PLANS AVAILABLE. SEE PAGE 62.

Seen at the NATIONALS

Thousands of models of all kinds made the Nats memorable. These nifties were typical.

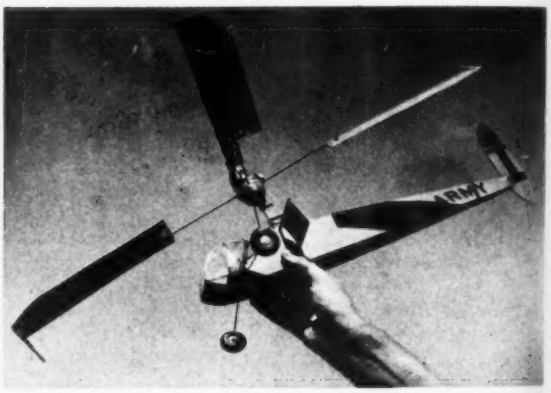
Smallest plane of the meet was this tiny control-line model by John Clemens. Power was a Torp Junior and the wing span was big 7".



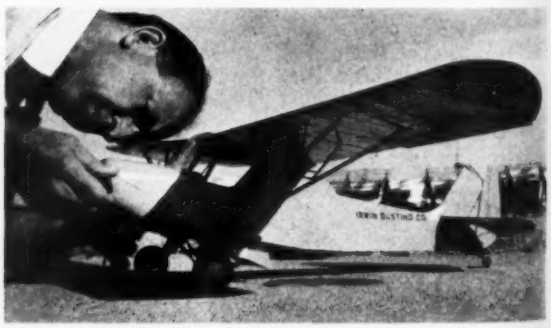
Super duper and awesome project—first place winning B-36 by Capt. R. Morehead, USAF team. Six Torpedo .19's and two 350 Jetex motors.

From the days of singing wires, a faithfully reproduced Curtiss Jenny, by Harold Roberts. Real ship was number one trainer in WW One.

National Champion two years running, Woody Blanchard checks out his Clipper Cargo job which lifted remarkable 43½ ozs. on a Cox .049.



Intriguing close-up of scale-type helicopter by Harry English. The rotor blades can pivot and flex as necessary on stiff wire supports.

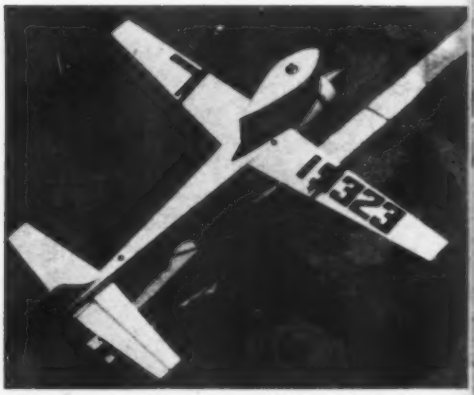


Possibly the most exacting scale job ever seen at the Nats, Tom Dean's well-known Aeronca crop duster. Morehead's 8 engines were too much.

One crate, double the work—almost. Fine F-82 Twin Mustang was the handiwork of George Neilson, who entered it in the scale ukie event.

Gorge Aldrich's Nobler (MAN plans) demonstrated precise pattern, won another Nats 1st.

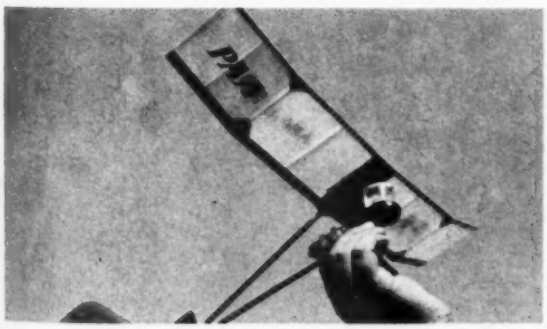
Arrowlike first-place combat in Junior, Kenneth Knotts. Combat jobs built mighty tough.



Close-up of Class A winning speedster, Larry Thomas. Note Scotch tape, left dolly wheel.

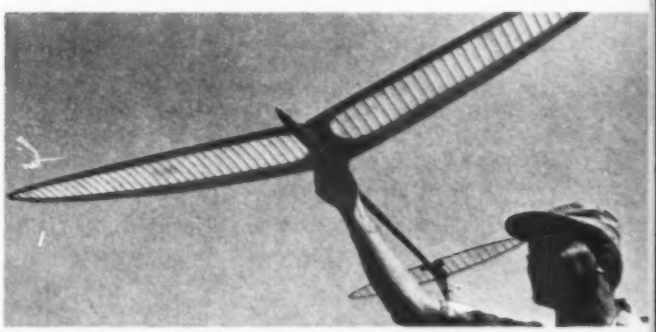
Winning Senior scale again, was Jimmy McCroskey's lovely Mustang, another MAN plan. Faithful copy of particular real ship. On a .29.

Latest style in Class B free flight displayed in winning model by Richard McGrath. Had 800 sq. in. wing, .29. And it handles easily.



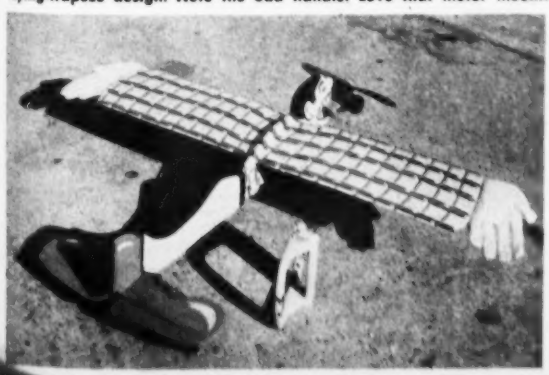
New Jet PAA Load event, sponsored by Pan American, produced tricky stuff to look at. This Chris Peterson design sure was functional.

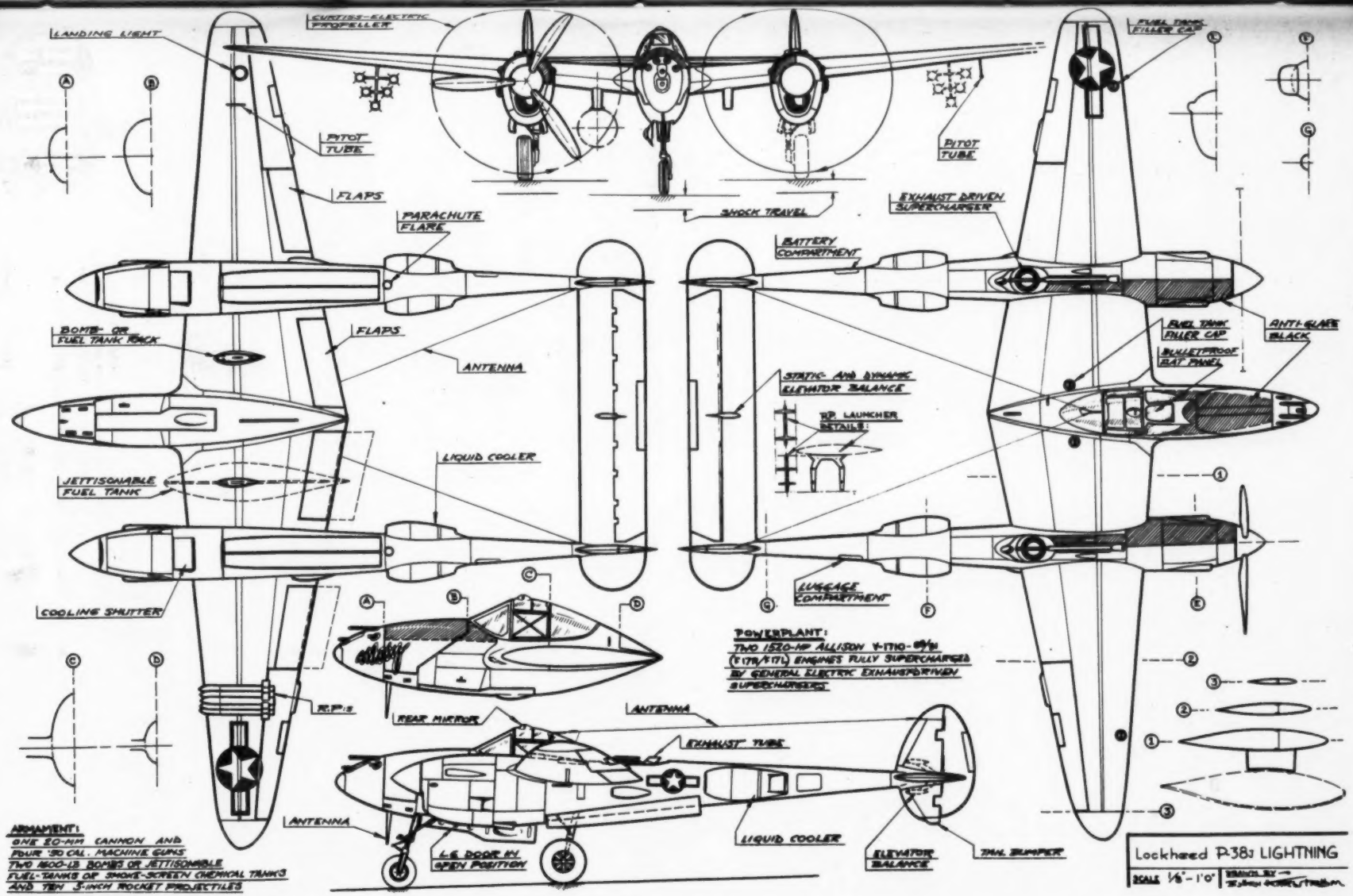
That man Clemens! Taught Navy personnel to fly with this man-on-the flying-trapeze design. Note the odd handle. Love that motor mount.



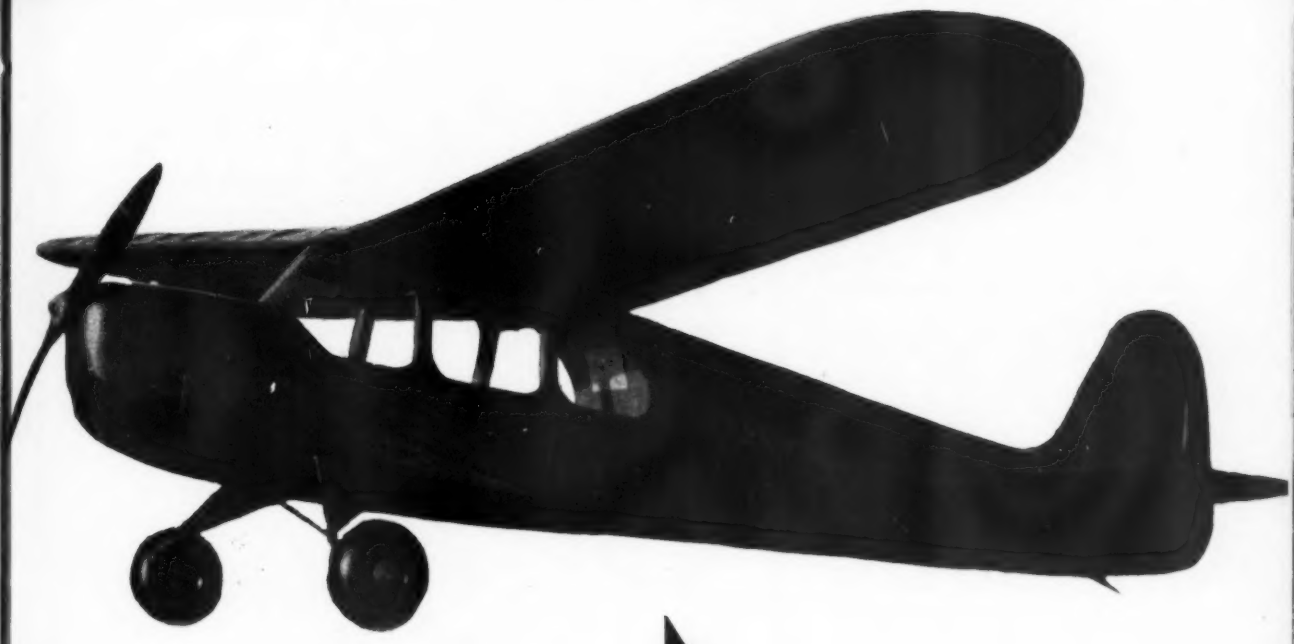
Expert of the mid-thirties, Jerry Ritz—remember the Ritz props?—with lovely elliptical-winged Nordic Glider. Didn't forget, did he?

Two .19's and a Dynajet made this AJ Savage live up to its name in Navy Carrier Event. Spectacular project carried out by Doc Martin.





Planes Worth Modeling—LOCKHEED P-38J LIGHTNING



the pacificoaster

Good looks and high performance—with safety—distinguish this old standby free flight and RC—.29 to .35.

by E. J. WEATHERS

► In this year 1956, it was considered possibly worth while to present a slightly modified version of the writer's original Pacificoaster, first designed and built in 1945, and now perhaps an interesting project for RC work in particular. The design has been well-proven for stable, realistic flying.

Modifications consist of simple elimination of the former ignition units and their access hatches. The recommended power has been reduced, mainly with the thought of radio control in mind, although it will perform well as a "straight" free-flight with this arrangement. The wing has been moved aft ¾" to allow for the lighter weight power plant. As flown in free flight contests, the plane was powered by an ignition Orwick .60, a quite powerful engine.

Original versions of this ship have been flown free-flight under wing loadings as high as 21 ounces per square foot of supporting wing surface! One such flight lasted over 10 minutes on a 20 second maximum engine run, in an officially timed free-flight gas model contest.

Anyone planning to build an RC version should add access hatches for receiver, etc., in the basic frame structure under the wing position area. Also, and very important, the present rudder trim tab (as presented here for non-RC free-flight) will have to be increased considerably over its present area, in order to be adequately effective at the slower air speeds to be involved, and during the glide. A suggested configuration is shown in dotted lines.

A number of Pacificoasters have been built for RC in the east, by adding a foot of span. One good model even had

(*Continued with drawing on next page*)

A five-foot design, it was first flown in 1945 on an ignition Orwick .60! Handles power! For RC, a .19 will do if light, .29 if it is heavy.

a Triumph engine for power. Here, it will take the hard bumps of any obstacles well.

The basic fuselage frame is first built, upside-down on the workbench. The cabin can next be added, followed by the turtle-deck structure. It is completed by building up the nose section and adding the landing gear. The landing gear should be well-anchored, using wrapped linen or nylon thread of fairly heavy grade. The bottom stringers may next be added.

The wing is not too unconventional in construction. The most care will have to be exercised in building the wing tip areas, which curve up from the bottom, in the front elevation. As can be seen on the plans, the wing attaching rubbers are contained *within* the wing, giving a cleaner job of attachment, instead of wrapping them around the fuselage as an eyesore.

The empennage is quite conventional. It is optional with the builder as to whether it is to be permanently assembled in place or attached with rubber bands. If the latter method is used, peg 'keying' must be employed. The important thing is to be absolutely sure that the center line of the horizontal stabilizer is parallel with the upper fuselage longerons, or at 0 degrees.

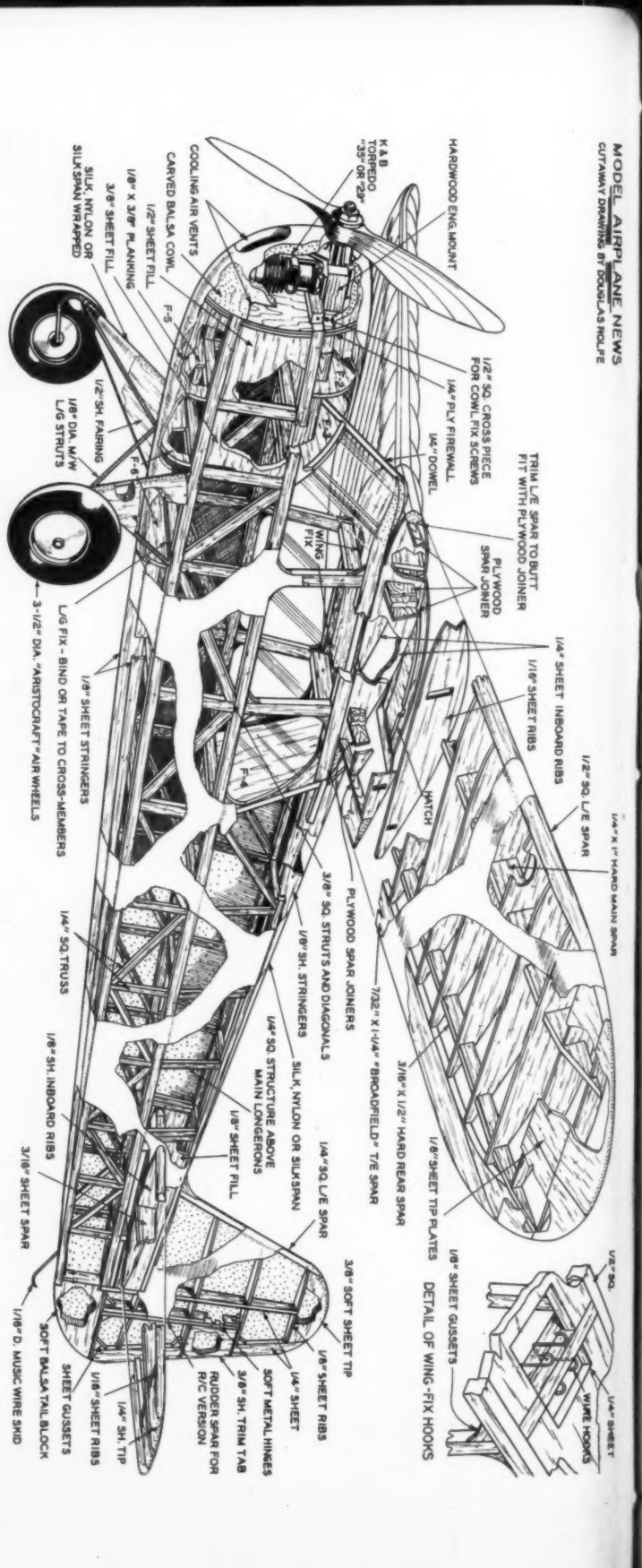
It would be a wise idea to cover the landing gear fairings and particularly the engine cowling with crinoline, to strengthen these units against flight strains.

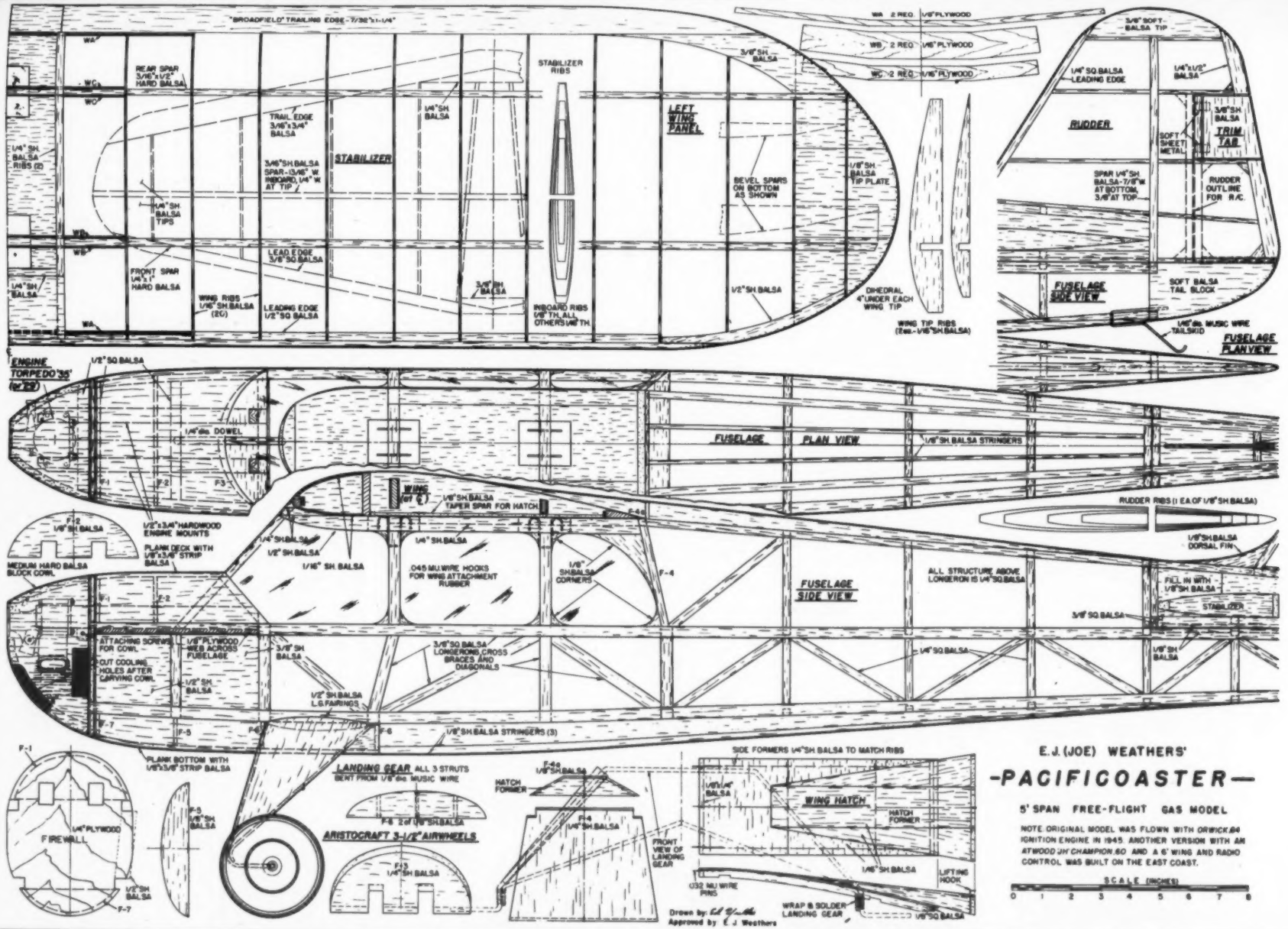
Your Pacificoaster may be covered with paper or fabric. The original model has nylon covering which is still in good condition after 11 years. Nylon is heartily recommended for a covering material, due to its extreme toughness, particularly in shock reaction.

Your model should balance for trial glides quite well as built, if plans have been carefully followed. Slight adjustments may be made with nose or tail weights, as necessary. If built for RC, the location of the RC gear will accommodate any trimming for balance, with little difficulty.

Be sure and write Model Airplane News as to your flight results with the ship, and send photos if possible. Its designer will also be most happy to hear from anyone who has gone ahead and completed one to flight stage, especially as a radio-controlled project. Write me in care of the editor.

Detailed cutaway drawings like the illustration of the Pacificoaster, right, are an old story to aviation artist Doug Rolfe. A veteran of the illustrating field, especially as it applies to science and aviation, he also has been a barnstorming pilot and modeler back to the days of WW I.





FULL SIZE PLANS AVAILABLE. SEE PAGE 62.

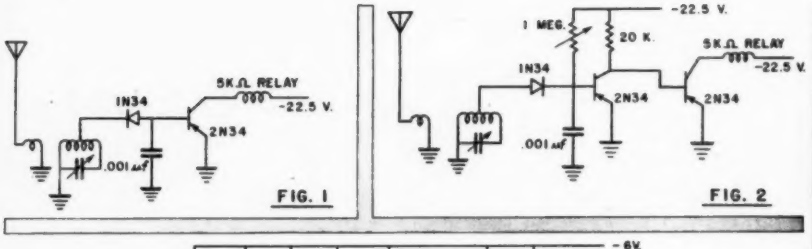
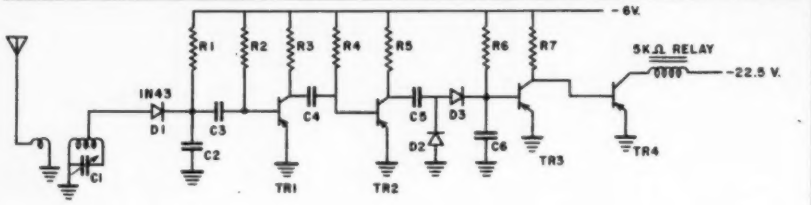


FIG. 1

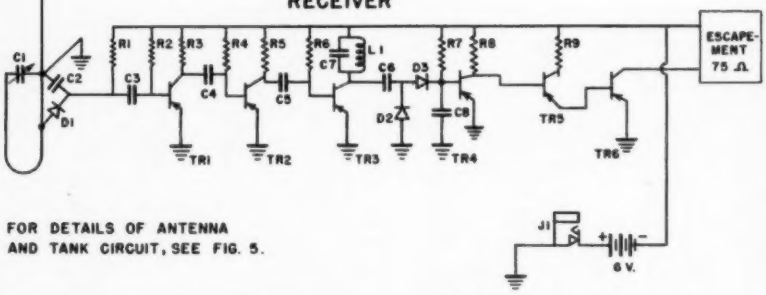
FIG. 2



C1	3-30 μμf	R1	SEE TEXT	TR1	2N132 TRANSISTORS
C2	.001 μf	R2	SEE TEXT	TR2	
C3	1 μf 6V.	R3	12,000 Ω	TR3	
C4		R4	SEE TEXT	TR4	2N34 TRANSISTOR
C5		R5	12,000 Ω		
D1	IN34	R6	SEE TEXT		
D2		R7	12,000 Ω		
D3					

FIG. 3

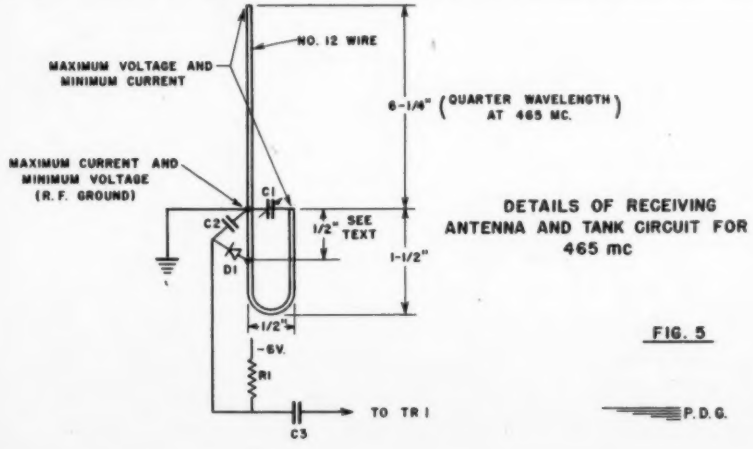
TYPICAL TRANSISTOR RECEIVER



FOR DETAILS OF ANTENNA AND TANK CIRCUIT, SEE FIG. 5.

C1	1-8 μμf	R1	470,000 Ω	L1	SEE TEXT
C2	50 μμf	R2	SEE TEXT	J1	CLOSED CIRCUIT JACK
C3	1 μf 6V.	R3	12,000 Ω		
C4		R4	SEE TEXT	TR1	2N132 TRANSISTORS
C5		R5	12,000 Ω	TR2	
C6		R6	1 MEG. Ω	TR3	
C7	SEE TEXT	R7	SEE TEXT	TR4	
C8	1 μf 6V.	R8	12,000 Ω	TR5	
D1	IN172	R9	1,500 Ω	TR6	2N186 TRANSISTOR
D2	IN34				
D3	IN34				

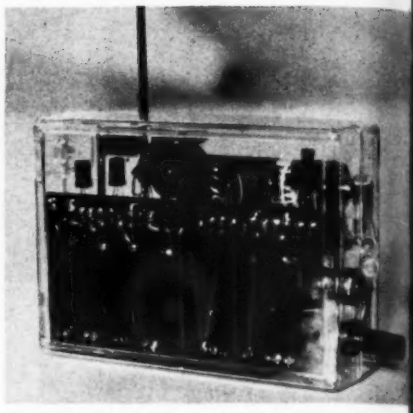
FIG. 4



DETAILS OF RECEIVING ANTENNA AND TANK CIRCUIT FOR 465 mc

FIG. 5

P.D.G.



This 465 MC receiver is fully transistorized. Fits easily into plastic box—with batteries.

experiments

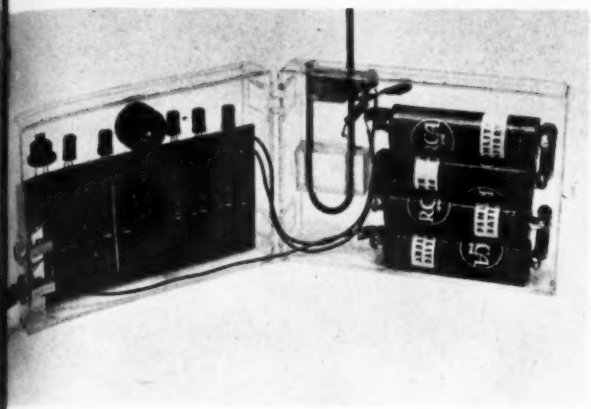
by IRWIN WALLMAN

► Last summer I had the idea that, by using the 50-Watt amateur transmitter in my car, I could obtain enough range to operate a 29 megacycle transistor in a radio-controlled plane. I succeeded in making such a receiver for 29 MC and, after several months additional work, I came up with a 465-MC receiver that had sufficient range for RC work, using a small one-Watt hand-held transmitter. The final receiver that is shown in the photographs weighs six ounces complete with all batteries.

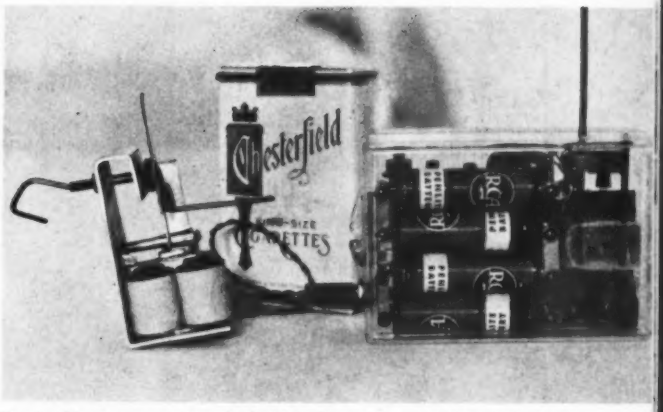
My experimentation with this type equipment led me to the conclusion that a transistorized receiver for RC work, particularly for 465 MC, must follow a certain basic type of circuitry. In order to give the enthusiast an idea how this type of circuitry operates, I will explain the developments that led to the receiver shown in the photographs.

The original transistor receiver that I constructed used a 1N34 diode as an RF detector. This part of the circuit is the same type used in a field strength meter. In order to obtain enough power to operate a relay, I included a transistor as a DC amplifier. (Fig. 1). By using 50-Watt, 10-meter amateur transmitter, I was able to obtain relay operation at a distance of 150 feet from the transmitter. About the only thing equipment like this can be used for, is to fly a model in tight circles around the transmitter.

This showed that a receiver with many times the sensitivity would have to be used. I noticed that with a quar-



Better impression of the small size of the receiver is afforded by comparison with Penlite cells. Authors reports best results on 220MC.

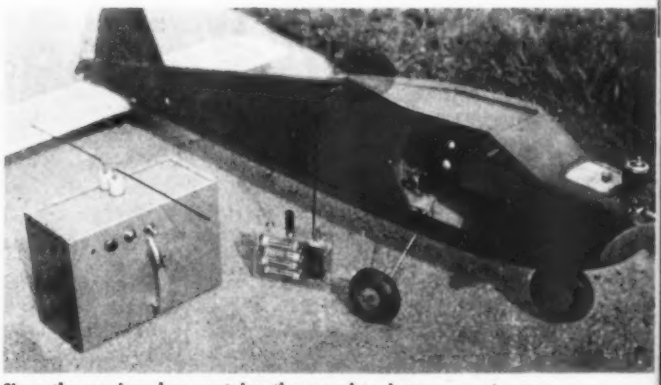


How's this for compactness! Modulated tone is used. Big difficulty for experimenter on 465 is FCC non-approval of home-built X-mitter.

with transistors

For most of us this is deep, deep stuff, but for a radio man who talks to the electrons, this is a valuable report to advance radio control art for all.

Installed in a Royal Rudder Bug, one of the author's transistorized receivers leaves room to spare. Battery compartment is unused.



Since the receiver box contains the complete battery supply, it is a cinch to slip equipment in and out of the cabin. Short antenna.

ter-wave length antenna 9-feet long, the sensitivity was greatest. This was too long for a model so a shorter antenna was used with a sacrifice in range. To increase the sensitivity of the receiver I added another transistor as a DC amplifier (Fig. 2). This increased the range to over 700 feet, still using the 50-Watt transmitter, but the operation was unreliable. The variable resistor R1 required frequent adjustment to maintain maximum sensitivity while at the same time keeping the relay from closing without a signal. This trouble can be accounted for by the temperature sensisivity of transistors in general.

In order to eliminate this drift due to the DC amplifier and at the same time increase the range, a capacitor coupled amplifier was built (Fig. 3). This amplifier will not respond to a DC signal, which means that a tone-modulated transmitter must be used. Since this particular amplifier has broad band response, any tone from about 100 cycles to over 10 KC can be used.

Operation of this receiver is as follows: The modulated R.F. signal at the antenna is detected by diode DI. This signal will be of relatively low amplitude when the receiver is at its maximum range from the transmitter. In order to increase this signal to a useful amplitude, a two-stage audio amplifier consisting of transistors TR1 and TR2 is used. The output of this audio amplifier is detected by diodes D2 and D3, causing a less negative voltage to appear at the base of transistor TR3. This will cause the collector of TR3 to go negative. This negative voltage is connected to the base of TR4 which causes TR4 to conduct and operate the relay. A Sigma 4F, 5000-Ohm relay works well for this application.

This receiver was used successfully for many flights, but my 50-Watt transmitter had to be used. However, the range is sufficient to control a model boat using a 27.255 MC. 1-Watt transmitter.

I investigated the possibility of using a transistorized regenerative receiver on 27 MC. There are transistors that will amplify at this frequency, but when used in a regenerative circuit, their instability necessitates constant adjustment of the regeneration control. The same trouble will be had if regeneration is attempted at the audio frequency (*Continued on page* 54)

tissue stick

by ROBERT HAWKINS

Young Brent Hawkins, now Junior National Champ, flies this three-time Nats winner.

Brent releases the model on a test flight back in 1954. Design itself was worked up by his dad.

► About two years ago, an article appeared in Model Airplane News titled, "Should Microfilm be Scrapped." The main thing this article did was draw enough attention to indoor model flying to get Class B Paper Stick event added to the AMA rules.

The model shown here was flown as a "Paper Stick" at the 1954 Nationals at Chicago even before the event was recognized by the AMA. Therefore, it flew against microfilm models, but its time of 4 minutes 10 seconds was quite satisfactory for its then ten-year old builder. A lighter version won first place in the Junior Paper Stick event at the 1955 Nationals at Los Alamitos. Time was 6 minutes 6.4 seconds, a Junior AMA National Record. A model of the same dimension, only covered with microfilm, flew to first place in the Indoor Stick event at the 1955 Nationals, posting a time of 8 minutes 32 seconds.

Construction has been kept quite simple so that a beginning model builder can successfully complete the plane. Refinements such as a tapered, oval section spars can be added to later models after experience is gained building the plane, as shown in the drawings. The plane is strong enough for novice indoor modelers to handle.

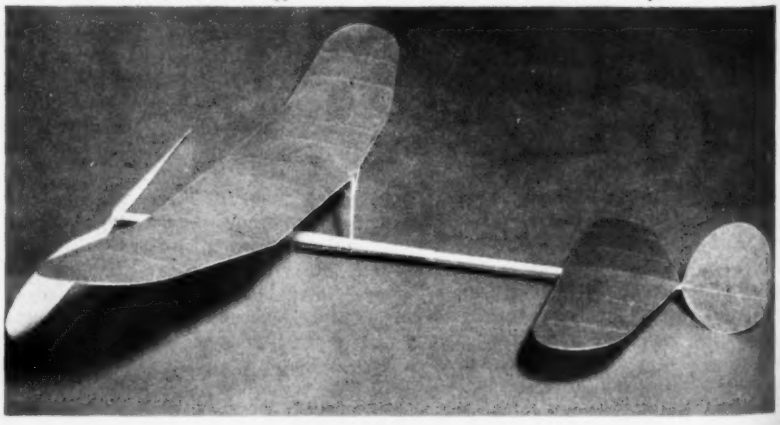
To begin construction, cut the motor stick blank to the dimensions shown from soft 1/32" sheet balsa. Soak the blank in hot water for about ten minutes and then carefully bend it around a 1/4" wood dowel, wrapping it carefully with 3/4" surgical gauze. Be careful to keep the seam straight down the top of the motor stick when wrapping the gauze in place. Place the wrapped blank and dowel in a warm oven and bake for about five minutes. It pays to check every minute or so. You don't want it a dark brown color! Instead, you just want to dry it out. After the blank is dry, remove the gauze and the dowel and carefully glue the top seam in the motor stick using *THIN* cement. The tail boom is constructed in the same way, using 1/32" sheet balsa that has been sanded to nearly 1/64" thickness. Of course, a tapered former must be used with the tail boom. Make it from hard-balsa, 3/16" diameter at one end and 1/8" diameter at the other.

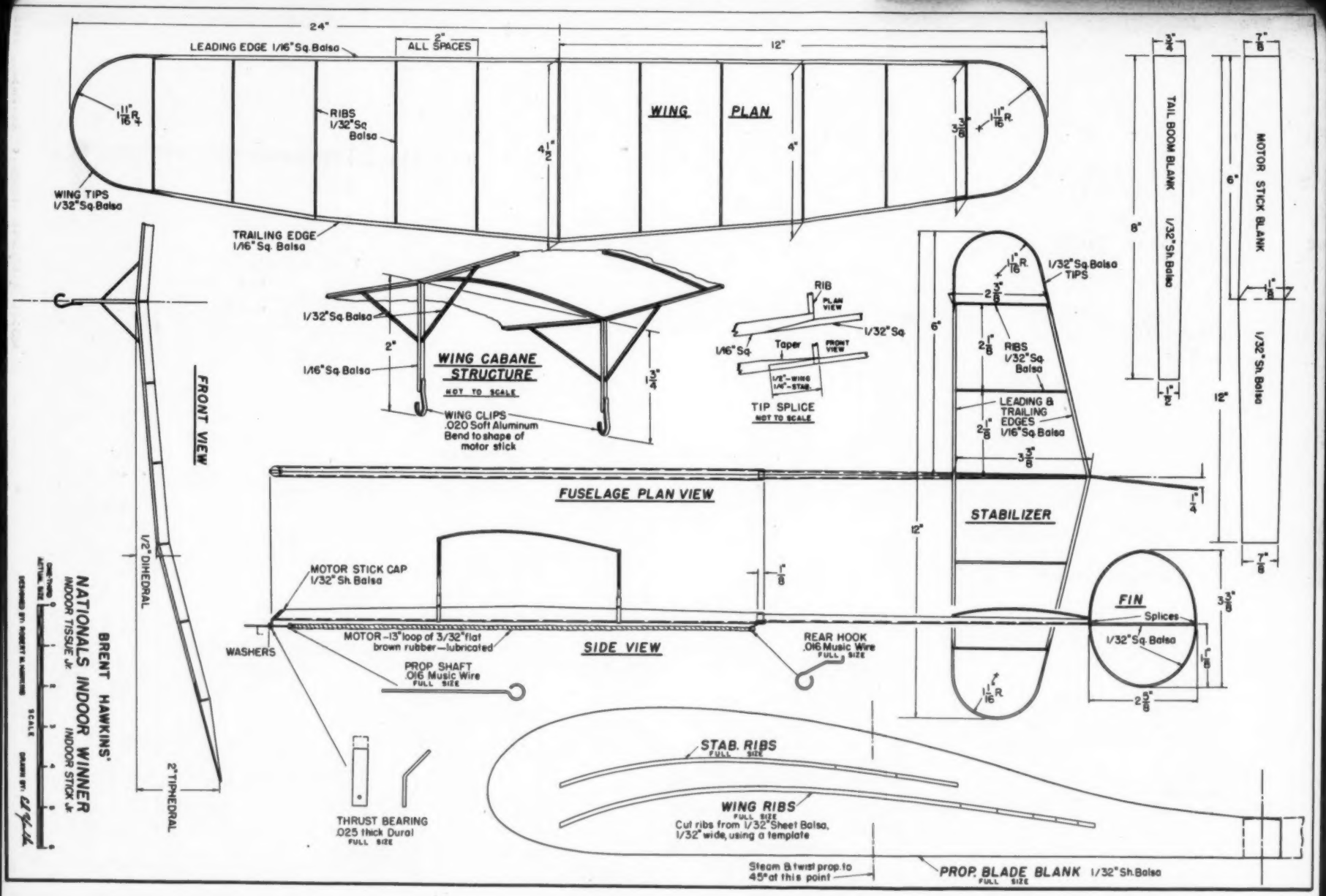
Assemble the tail boom about 1/8" into the end of the motor stick and cement firmly in place. Cut the front end of the motor stick at a 45° angle as shown and put a 1/32" sheet cap over the open end. Mount a dural thrust bearing on the front of the stick and a 0.16" wire hook at the rear as shown in the drawing.

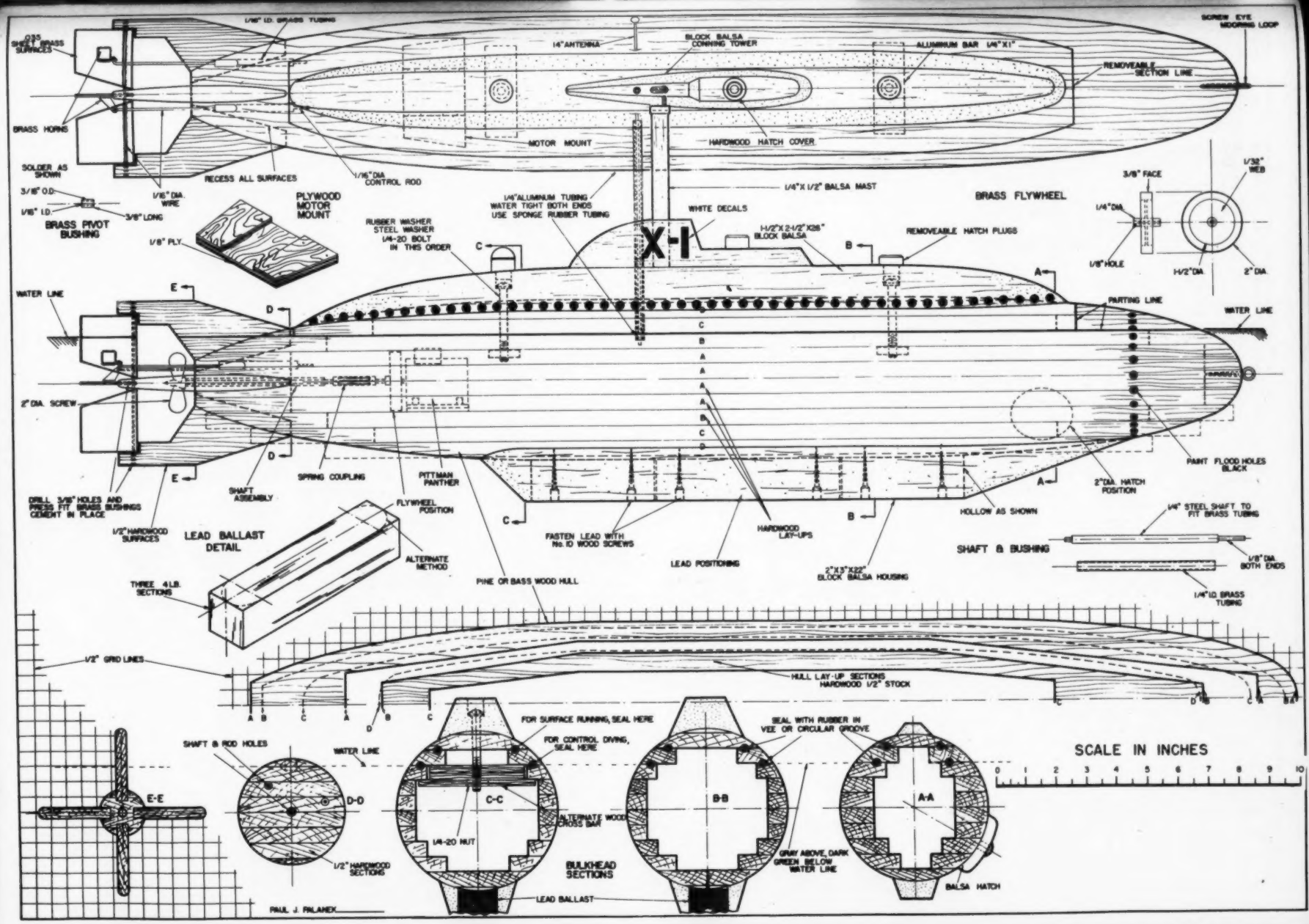
The wing is made with 1/16" square medium-balsa spars and 1/32" square ribs and wing tips. Build it flat on a drafing board or other flat surface and add the dihedral after the wing is completed. The ribs are cut as shown by cutting around a French curve or metal template. Slice eleven ribs from quarter grained 1/32" sheet balsa, moving the template down 1/32" from the edge as each rib is cut. Tips are bent from 1/32" square balsa by soaking them in hot water for about five minutes and then carefully bending them around a full size cardboard template that has been thumb-tacked to a drawing board. Carefully pin the strip in place and let it dry completely before removing and cementing to the wing.

Cover the wing in four sections, using smooth tissue paper. The center panels should be covered as two separate sections, using thin clear dope as a paper (*Continued on page* 64)

When tissue covered, this indoor type model did more than four minutes for 10-year old builder.




BRENT HAWKINS'
NATIONALS INDOOR WINNER
INDOOR TISSUE Jr.
INDOOR STICK Jr.
DESIGNED BY: ROBERT A. HAWKINS
DRAWN BY: Cliff Weld
SCALE
ACTUAL SIZE
ONE-THIRD
24"
2" ALL SPACES
12"
LEADING EDGE 1/16" Sq. Balsa
TRAILING EDGE 1/16" Sq. Balsa
WING TIPS 1/32" Sq. Balsa
RIBS 1/32" Sq. Balsa
WING PLAN
4 1/2"
4"
3 7/8"
11/16" R.
FRONT VIEW
1/2" DIHEDRAL
2" TIP DIHEDRAL
WING CABANE STRUCTURE
NOT TO SCALE
1/32" Sq. Balsa
1/16" Sq. Balsa
2"
1 3/4"
WING CLIPS .020 Soft Aluminum Bend to shape of motor stick
RIB
PLAN VIEW
1/32" Sq.
1/16" Sq.
Taper
FRONT VIEW
1/2" - WING
1/4" - STAB
TIP SPLICE
NOT TO SCALE
1/32" Sq. Balsa TIPS
2 1/8"
2 1/8"
RIBS 1/32" Sq. Balsa
LEADING & TRAILING EDGES 1/16" Sq. Balsa
2 1/8"
3 3/8"
6"
12"
STABILIZER
TAIL BOOM BLANK 1/32" Sh. Balsa
8"
MOTOR STICK BLANK
1/32" Sh. Balsa
7 1/8"
1/8"
FUSELAGE PLAN VIEW
MOTOR STICK CAP 1/32" Sh. Balsa
1/8"
WASHERS
MOTOR - 13" loop of 3/32" flat brown rubber - lubricated
PROP SHAFT .016 Music Wire FULL SIZE
SIDE VIEW
REAR HOOK .016 Music Wire FULL SIZE
FIN
Splices
1/32" Sq. Balsa
3 1/8"
2 5/8"
THRUST BEARING .025 thick Dural FULL SIZE
STAB. RIBS FULL SIZE
WING RIBS FULL SIZE
Cut ribs from 1/32" Sheet Balsa, 1/32" wide, using a template
Steam & twist prop to 45° at this point
PROP. BLADE BLANK 1/32" Sh. Balsa FULL SIZE

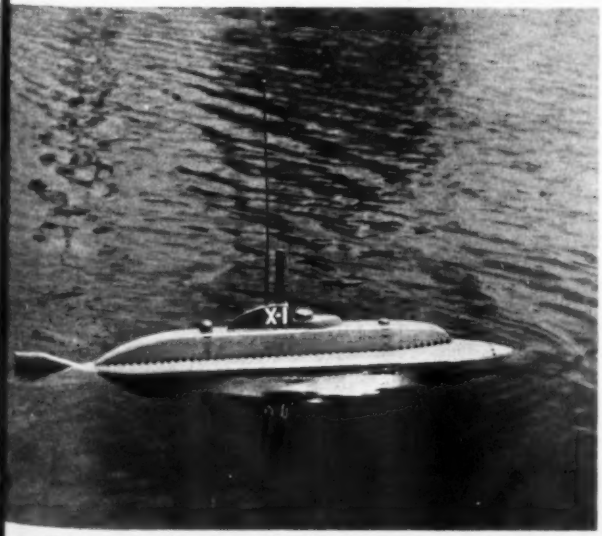

X-1
1/16" I.D. BRASS TUBING
.035 SHEET BRASS SURFACES
BRASS HORNS
SOLDER AS SHOWN
3/8" O.D.
1/16" I.D.
3/8" LONG
BRASS PIVOT BUSHING
1/16" DIA. WIRE
RECESS ALL SURFACES
1/16" DIA CONTROL ROD
PLYWOOD MOTOR MOUNT
1/8" PLY.
14" ANTENNA
BLOCK BALSA CONNING TOWER
ALUMINUM BAR 1/8" X1"
SCREW EYE MOORING LOOP
REMOVEABLE SECTION LINE
MOTOR MOUNT
HARDWOOD HATCH COVER
1/4" X 1/2" BALSA MAST
1/4" ALUMINUM TUBING WATER TIGHT BOTH ENDS USE SPONGE RUBBER TUBING
RUBBER WASHER STEEL WASHER 1/4-20 BOLT IN THIS ORDER
WHITE DECALS
1-1/2" X 2-1/2" X26" BLOCK BALSA
REMOVEABLE HATCH PLUGS
BRASS FLYWHEEL
3/8" FACE
1/32" WEB
1/4" DIA
1/8" HOLE
1-1/2" DIA.
2" DIA.
WATER LINE
PARTING LINE
2" DIA. SCREW
DRILL 3/8" HOLES AND PRESS FIT BRASS BUSHINGS CEMENT IN PLACE
1/2" HARDWOOD SURFACES
SHAFT ASSEMBLY
SPRING COUPLING
PITTMAN PANTHER
FLYWHEEL POSITION
LEAD BALLAST DETAIL
ALTERNATE METHOD
THREE 4 LB. SECTIONS
FASTEN LEAD WITH No. 10 WOOD SCREWS
HARDWOOD LAY-UPS
LEAD POSITIONING
2" X 3" X 22" BLOCK BALSA HOUSING
PINE OR BASS WOOD HULL
HOLLOW AS SHOWN
2" DIA. HATCH POSITION
PAINT FLOOD HOLES BLACK
SHAFT & BUSHING
1/4" STEEL SHAFT TO FIT BRASS TUBING
1/8" DIA. BOTH ENDS
1/4" I.D. BRASS TUBING
1/2" GRID LINES
HULL LAY-UP SECTIONS HARDWOOD 1/2" STOCK
E-E
SHAFT & ROD HOLES
WATER LINE
D-D
1/2" HARDWOOD SECTIONS
C-C
1/4-20 NUT
FOR SURFACE RUNNING, SEAL HERE
FOR CONTROL DIVING, SEAL HERE
ALTERNATE WOOD CROSS BAR
LEAD BALLAST
BULKHEAD SECTIONS
B-B
SEAL WITH RUBBER IN VEE OR CIRCULAR GROOVE
GRAY ABOVE, DARK GREEN BELOW WATER LINE
A-A
BALSA HATCH
SCALE IN INCHES
0 1 2 3 4 5 6 7 8 9 10
PAUL J. PALANEK

Whirring noises inside of dad's submarine fascinate young Palanek. Controls of the real sub are airplane type. Crew of four Frog Men.

Stood on end to show off lead ballasting, the scale sub looks like some kind of a bomb. Powerplant is Pittman Panther electric motor.

the Fairchild Guppy

Radio-controlled scale model of a new mini-sub operates under the water just as easily as on the surface. This amazing sub will dive and surface like the real thing. This is first of two instalments.



Test run on surface passes close by the camera man. Antenna sticks up above water so that control can be maintained underneath surface.

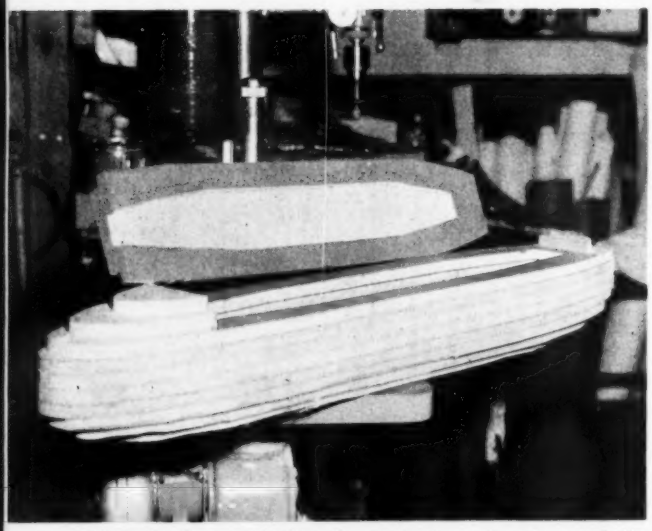
by PAUL J. PALANEK

► There have been many models built to function in the three mediums, land, sea, and in the air. Ah, but here we have something different: a model of our Navy's latest undersea ferret, the Fairchild Guppy submarine USS-X1.

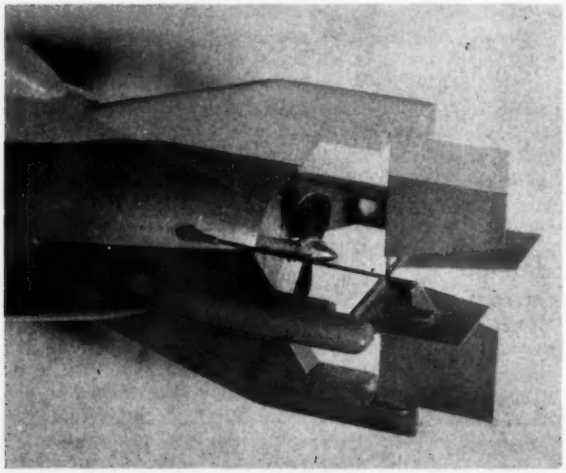
This craft of ours is fully radio controlled and rigged for diving through the use of a simple, cam-operated mechanism. This unit is such, that two cams are mounted one above the other, on a common gear-reduced shaft. Each cam has four dwell positions, two for straight running, one for up, the other down. A similar sequence is employed with the rudder control. Here we have a long dwell for straight running and two short dwells each for right and left turns. The modeler can modify these cams to suit his individual fancy. Since both cams operate on the same impulse they are staggered for sequence operations. Both push rods are fastened to the cam by being spring loaded for constant pressure contact. The sub can be dived to depth and make a left or right turn, depending upon the cam setting. She can ride surface by skipping over the diving sequence with two quick sig-

(Continued on next page)

And here our helper is tightening down one of the bolts that hold together watertight the upper and lower hull sections. Easy access.



This is the lay-up, glued-together laminations, of pattern maker's pine, the first step in making hull. Hard work but it is worth it.



Assembly of the rudders, diving controls, and the screw. All this is done on cheap, single-channel radio but what a field for multi!

nals. This is described in the second instalment

Our readers may question, "How come an airplane manufacturer was awarded a contract to build these Mini subs?"

The reason is that this particular project called for aircraft techniques. The Guppy is a slender, jewel-like and intricate as a streamline jet fighter. Her controls and instruments will be to the likeness of modern aircraft. Even more important, these "private eyes" can be mass produced in most any aircraft plant.

Primary function of the Guppy is demolition and harbor work. The craft is manned by a crew of four frogmen. It should be understood, however, that these are not suicide craft, as those manned by Japanese and early German sneak raiders. Our crews will have just as great a survival rate as those of regular submarines—and that's high.

On the surface, the minisub will have a top speed of 10 mph. Submerged in calm water she will be capable of 12 miles per hour. The key is said to be a new secret fuel, extremely powerful, that will give the X1 a range of much more than 500 miles, and an underwater endurance of at least several days. She could travel submerged nearly the length of the shallow Baltic Sea without refueling.

The more one looks into the possibilities of such a craft the more one is amazed. X1 has such a low surface silhouette that she passes almost invisible in a normal rolling sea. Also, her controls are to the likeness of a modern fighter plane with a "Dep" wheel for control. The movement of the stick will be instinctive, forward for down, back for up, and etc.

Amazing as this sounds, still more amazing is the small hull into which everything is fitted. The hull is only 50 feet long, with a diameter of seven feet. Man, that's tight! The weight, believe it or not, is less than one of the Queen Mary's anchors, or 25 tons. Can you imagine what a fleet of these Guppies might do to a harbor installation when dropped for duty by some super-copters, operating from a super aircraft carrier?

But let's commence with the model. If, on close examination, the craftsman concludes that this is not an ordinary run-of-the-mill model, it is not intended to be. If the costs seem prohibitive, they are less painful when building time is stretched out. In this instalment we are going to build the sub, except for electronic gear and push rod controls, and save the ballasting for the last details in construction.

Complete weight is required for proper balance and trimming. By this we mean, the running gear, which will be described in the second instalment, must be included. We might mention that the sub is like a water-soaked log which is the secret to its diving ability. A good shove will send the sub underwater for a good distance before it surfaces. The all-up weight of the boat will reach a staggering 20 to 27 pounds, depending upon materials.

In selecting a sturdy technique for hull construction we chose as the material, 1/2" x 6" pattern maker's pine, poplar or bass, all even grain and soft. The method employed is the sandwich lay-up, using liquid Weldwood glue for fastening. The plans show the individual sections, note that two of each are required. The two upper sections are cemented separately, then secured in place to form the removable top section. Before fastening, paint the separation line a vivid red to highlight this section when parting the hull.

Whittle away at the hard wood with a sharp kitchen knife. Should a school wood-turing lathe be available, make use of it with instructions from a proper supervisor. This will indeed simplify matters. The hull's cross-sections take the shape of concentric circles. A group of cross section templates (*Continued on page* 50)

Just Out!

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the

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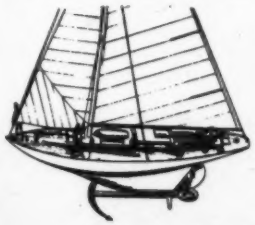

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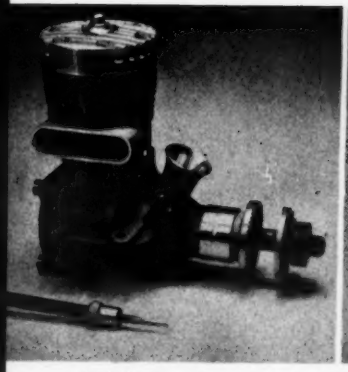
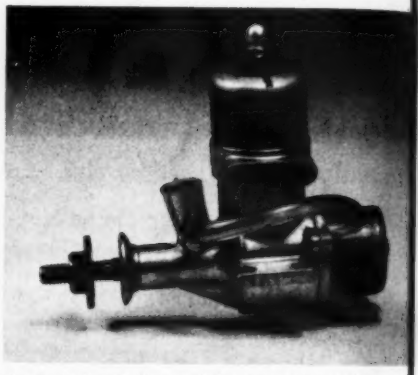
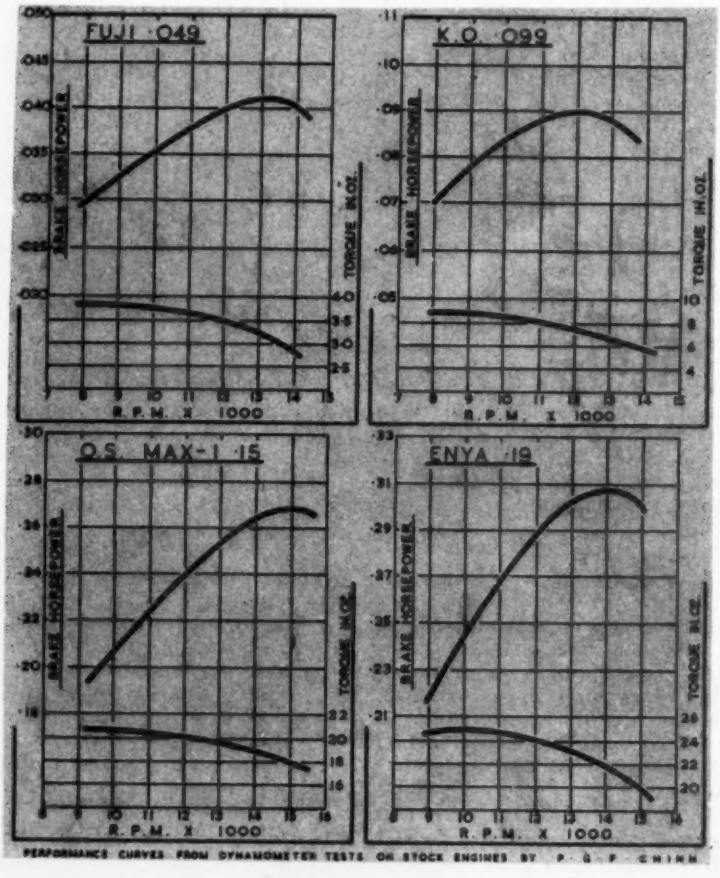
Big, multi-engined, scale, control-line models hold a great fascination for Japanese modelers.



Claiming attention in the U.S., is the Max. 35, which is employed for stunt and combat flying.



Kondo K.O. .09 has radial ports, twin stacks.



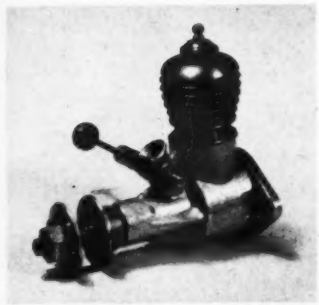
PERFORMANCE CURVES FROM DYNAMOMETER TESTS ON STOCK ENGINES BY P. G. F. CHINN

by PETER G. F. CHINN

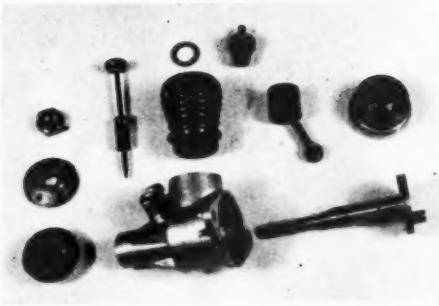
Outside of this country and Great Britain, Nippon is the largest producer of gas engines. This analysis and review by a leading authority gives the complete picture.

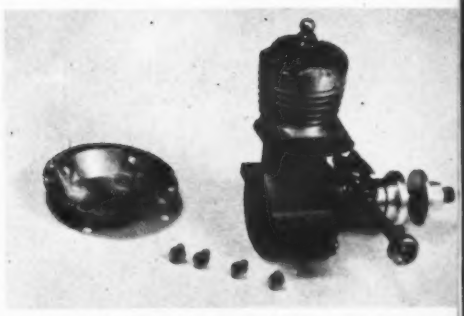
EDITOR'S NOTE—*In recent years this magazine has presented round-ups of engines made in Great Britain and Germany. These articles definitely do not suggest that the reader buy a foreign engine in preference to one made in this country. American mass-produced engines are noted the world over for quality and high performance. The purpose of these articles is to give the interested American modeler the picture of what other nations are doing in his chosen hobby.*

► Collectively, Japanese model motors are more closely modeled on the American pattern than those of any other country. They are almost exclusively of the glow plug, rather than Diesel, type and are usually similar in design to typical domestic motors. Moreover, Japan has adopted the familiar American practice of naming engines according to their cubic inch displacement; for example: Fuji .049, Mamiya .09, Enya .19, O.S. .29, etc., whereas, with some exceptions, we find other foreign manufacturers using cubic cen-



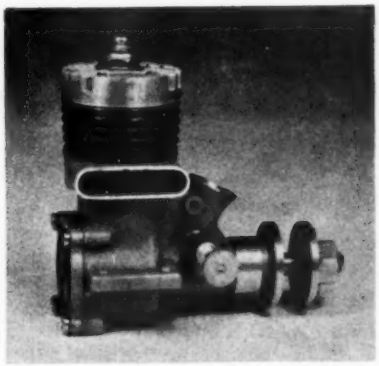
Fuji .049, has one-piece cylinder, with integral head. Performance better than exterior finish.



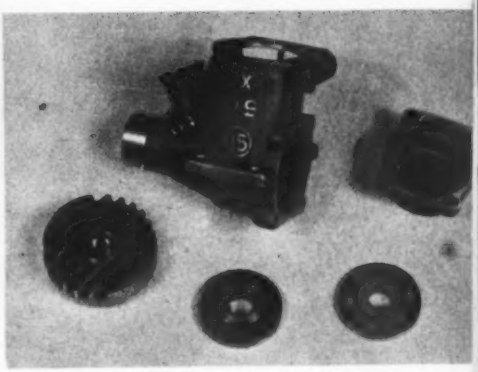


Enya's .19 features this unusual ring mount.

Roc, first Jap Half A engine, looks like Cub.



New contender in the FAI class is Max .15.



Note excellent die-castings, in photo at right.

timeters (Mills .75, Waf 1, Elfin 2.49, Amco 3.5, etc.) or giving their engines names or series numbers (Webra "Piccolo", Taifun "Rasant", or Super-Tigre G.24, Oliver Mk. III, etc.).

During the past three years, Japanese engines have enjoyed steadily increasing attention in overseas markets. This is not without good cause. Some of these engines are well made and of exceptionally good performance. All are a good deal cheaper than most other foreign engines and are generally cheaper than equivalent American products also. One thing that has impressed us with one or two of the bigger Jap manufacturers, is the speed with which they get new types into production.

Up to the present time, two good Japanese makes have been adopted by American importers: the O.S., handled by World Engines of Warren, Ohio, and first imported by Bill Atwood, and the Enya, sold through the Eureka Importing Co. of San Diego, Calif., and Aristo Craft, Newark, N.J. Servicemen in Japan will be acquainted with many other types, including O.S. and Eureka pulse-jet motors. However, our present report deals with piston engines only.

O.S. motors are made by the Ogawa Model Manufacturing Co., Ltd., of Osaka. Mr. Ogawa has been building engines since 1936 and is thus the oldest established model motor manufacturer in Japan. During this time, about 20 different types have been marketed. The first O.S. to draw favorable comment outside Japan was the .29. A shaft-valve unit, it was unusual, among B class motors, in having a radially ported cylinder. Bore was .740 in. and stroke .680, giving a displacement of .292 cu. in. Weight was 7.5 oz. and the horsepower output was in the region of .4 bhp at 12,000 rpm. Like nearly every Jap motor, it had a bronze main bearing.

A class C motor (.362 cu. in.), of identical design, was also manufactured, the bore and stroke in this case being .780 x .760 in. These motors, incidentally, carried one of the most elegant instruction manuals we have yet seen with any model motor. Printed in three colors on glossy paper, it contained a three-view, crisp half-tone illustrations, including a nicely executed cutaway drawing, and full dope on fuels and plugs.

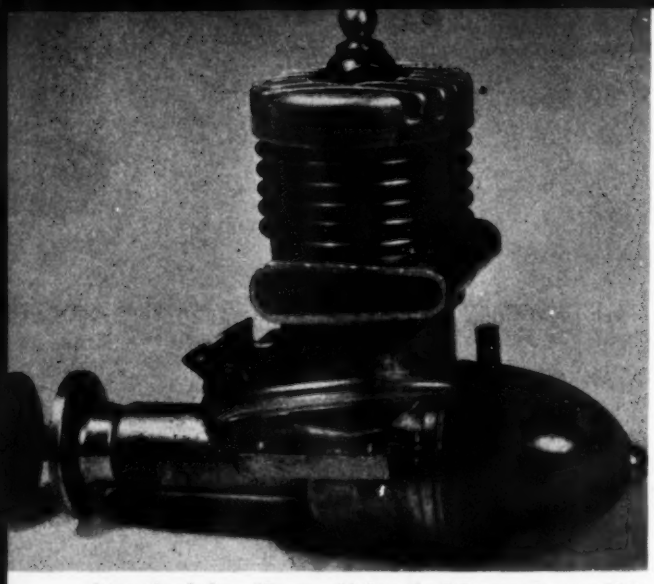
Of similar appearance and simplified design was the O.S. .099. This attractive little motor was, we found, an instant starter hot or cold and ran exceedingly well, an output of .091 bhp at 12,000 rpm being obtained on dynamometer test. Displacement was .0989 cu. in., bore and stroke being .504 x .496 in. Weight was 2.25 oz.

We use the past tense when speaking of these engines because the entire engine production capacity of the O.S. factory has, for some months, been concentrated on the new Max-1 series, and, if the demand for the Maxies continues at its present rate, it appears unlikely that the manufacturers will return to making the other models: rather, an effort will be made to evolve new designs in the other displacement classes.

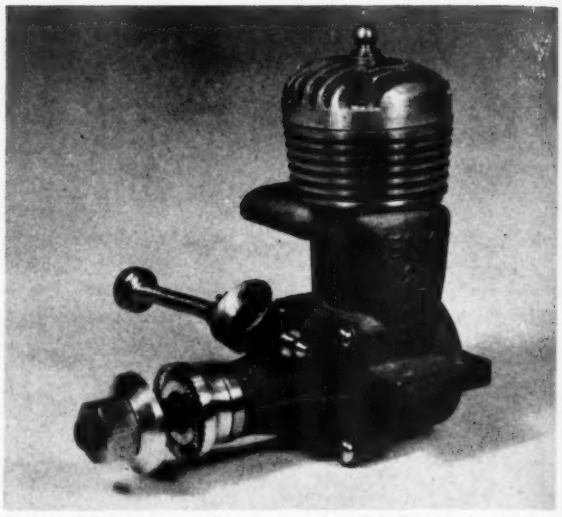
The Max engines first appeared late in 1954 in .29 and .35 versions. Dimensions are .740 x .690 in. (.297 cu. in.) for the .29 and .810 x .690 in. (.335 cu. in.) for the .35. They follow the modern loop-scavenged, big-port layout and are the hottest engines thus far produced in Japan, the .29 giving around .5 bhp and the .35 nearly .6 bhp at speeds in the region of 15,000 rpm. Opinion may differ as to what constitutes a good looking motor, but, for our money, the Maxies, with their combination of matt grey and polished aluminum, with black cylinder fins, are among the best looking model airplane motors ever built. Internally, we find a counterbalanced shaft with blued web, bronze-bushed drop-forged conrod and, unusual in a lapped-piston motor, supplementary skirt transfer ports. Each Max comes with a 7 mm. and an 8 mm. venturi reducers and hard-rubber dust plugs for the exhaust and intake.

Last year, O.S. introduced a new small model Max, the .15, designed to fit into the popular "International" (2.5 c.c.) class. It is certainly one of the best glow-plug motors of this dis-

(Continued on next page)



International class .15 was added to the Fuji range in year 1955.



Enya Model 5002 is one of more rugged, well-built .29's from Tokyo.

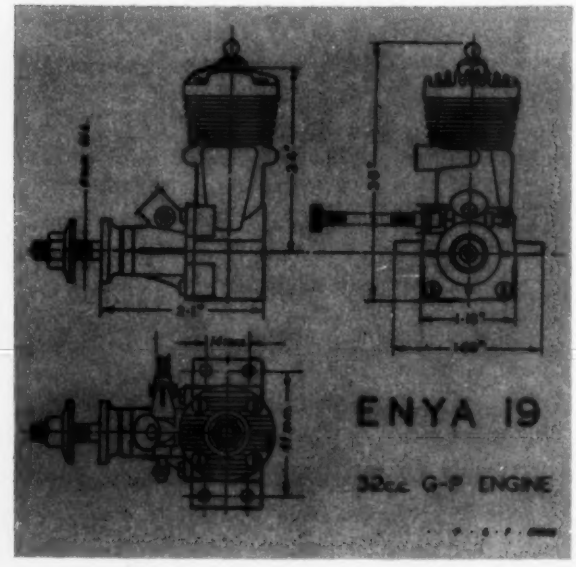
placement currently available. We obtained an output of close to .27 bhp on test using a 25-percent nitro content fuel. The motor weighs 3.5 oz.

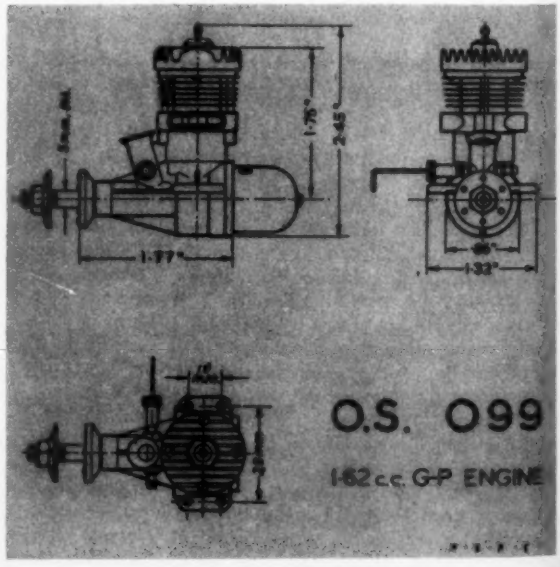
The Enya engines are built by the Enya Metal Products Co. Ltd., of Tokyo, under the direction of the brothers Sabro and Yoshiro Enya. Listed are four types: .09, .19, .29 and .63. The .19 and .29 are of similar design and we found them to be good performers, nicely built and evidently made to stand up to considerable use. They employ a one-piece crankcase/cylinder-block diecasting with pressed-in liner. The main bearing housing is bronze bushed and is integral with a short, raked intake in which the spraybar is positioned close to the crankshaft port. As on many Japanese engines, the aluminum cylinder-head embodies a cast-in brass bush for the glow-plug. The .19 has a displacement of .196 cu. in., obtained from a bore and stroke of 16 x 16 mm., and the .29 displaces .294 cu. in., (19 x 17 mm. bore and stroke).

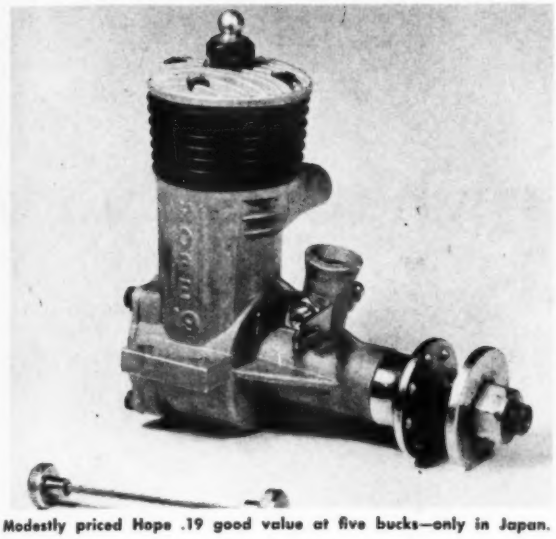
The Enya .63 is the biggest Japanese motor in current production. Actual displacement is 10.405 c.c. or .6127 cu. in., obtained from a bore and stroke of 24 x 23 mm. and the output is around .8 horsepower. Construction is similar to the .29 model except that the front housing flange is hexogonal and is attached with six screws. The engine is easily recognizable by the unusual duct attached to the exhaust stack. Weight is 13 oz. The most recent addition to the Enya range is the .09 model, which we have not tried personally, but which is supposed to be the best .09 currently available in Japan.

One of the biggest ranges is that of the Fuji company, who list six models. Here, incidentally, we should explain that the Fujitokushukiki-works of Tokyo, makers of the Fuji model engines, are in no way connected with the Fuji aircraft or motor-cycle manufacturers. Similarly, although Minoru Sato, maker of the Mamiya model engine, was formerly associated with Mamiya, the manufacturer of the well-known Japanese cameras of the same name, the two have no other connection.

Fuji's smallest motor is the .049, which follows the usual radial port, shaft-valve layout, but, unlike American half-A's (with the exception of the O. & R. Mid-jet) has the entire cylinder and head machined in one piece. Al-







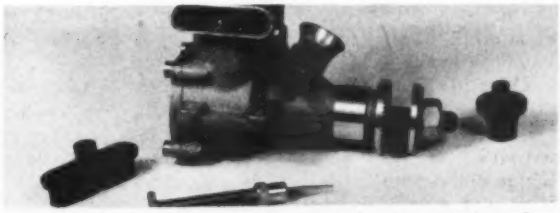
Modestly priced Hope .19 good value at five bucks—only in Japan.

Disassembled Hope .19, right, like other Jap engines, is orthodox.

though not too much attention has been paid to external appearance, we found the Fuji .049 to be well-finished internally and easy to start. The motor has been put in both radial and beam mount types. Bore and stroke are 10.2 x 10 mm., giving a displacement of .0499 cu. in. and the weight is 1.45 oz.

Of similar layout, but using a revised crankcase design with integral twin exhaust stacks, are the .099 and .15 models. These employ an unusual head construction in which the cylinder is again in one piece with the head, but has an aluminum finned head peened to a raised boss surrounding the plug hole. Both engines are beam-mount types and are equipped with anodised aluminum tanks. Displacements are .0982 cu. in. (12.7 mm. x 12.7 mm.) and .151 cu. in. (15 x 14 mm.).

The radial port, shaft-valve layout is also retained for the .19, .29 and .35 and all are plain bearing (bushed) models, although Fuji did make a disc-valve, ball-bearing .29, now discontinued. The Fujis are among the cheaper Japanese engines. Also moderately priced are the Hope .19 and .29 which retail, in Japan, at the equivalent of



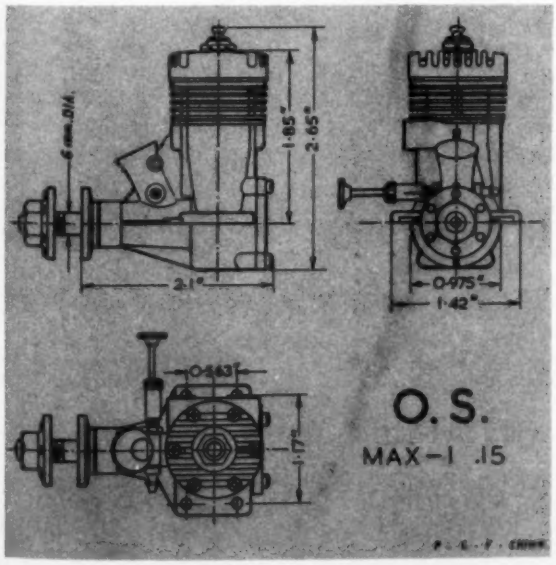
Nice touch in O.S. engine is rubber dust plug for venturi, stack.

$4.45 and $5.00 respectively. These engines have a "square" bore and stroke, 16 x 16 mm, for the .19 (.196 cu. in.) and 18.4 x 18.4 mm. for the .29 (.299 cu. in.). TheHope .19 and .29 follow the modern loop-scavenged trend with square valve port and exceptionally deep by-pass port. An unusual appearance item is the chromium-plated drive hub. We were particularly impressed by the quality of diecasting on these inexpensive motors.

Newcomers to the market are the K.O. engines, introduced in 1954 and built by the Kondo brothers, Japanese u/c speed exponents. Listed are three glow motors (.099, .19 and .30) and three Diesels. We found the .099 glow model to be a pleasant little engine, easy to start and adjust. It uses an annular port cylinder screwing into the crankcase which has twin stacks. Bore and stroke of the motor are 12.6 x 13.1 mm., giving a displacement of .0996 cu. in. Weight is 2.4 oz.

Diesels have not received much attention from Japanese manufacturers, although, since the advent of the McCoy and Herkimer Diesels, some c.i. motors have appeared on the market. The first was the O.S. 1 c.c. (.06 cu. in.) which was generally similar to the earlier type British E.D. "Bee". The K.O. Diesels next appeared, in the form of a Diesel version of the .099, just described, and a .049 model which uses a crankcase and tank-mount similar to those of the Atwood .049/.051. Last year a .15 model was introduced, using the familiar shaft-valve annular port layout favored for Diesels of this size. We understand that the engine is also being produced in a ball bearing version.

Japanese total production figures are, of course, a good deal less than American standards, particularly in the smaller displacement classes. In all, however, the Japanese industry has the largest selection of model motors outside the U.S.A.



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TESTORS

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Fourth-place multi-winner at Nats was Dean Kenney. The huge fuel tank and downthrust, also the well positioned gear, of interest.

Confounding the experts who don't fly trim elevators, Dale Root narrowly missed first with Babcock three-channel and huge flippers!

Radio Control News

Smog Hog, Bonner's simple stunter took top honors. Five-channel CG transistorized equipment. Note loose splinters in that left wing!

By EDWARD J. LORENZ

Here we go again! While you've been flying things have been popping. New ideas, new items, wonderful crates. Clear the air!

TECHNICAL TOPICS

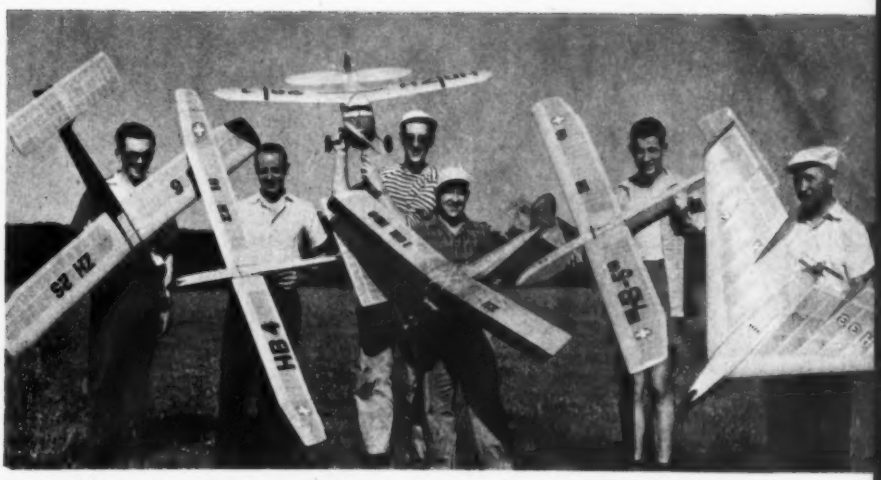
► The information given this month should answer a lot of the questions asked by RC fans. First of all, for the benefit of the newcomers to RC work, and as a reminder to the more experienced, who sometimes forget, a word about causes of fly-aways. This information was given by the East Bay Radio Controllers, Oakland, California, and is just plain basic common sense: 1. Low batteries –check batteries UNDER LOAD; 2. Receiver not tuned correctly–range check transmitter and receiver, at least 1/3 to 1/2 the ground distance of the range you wish to fly; 3. Unwound escapement rubber–establish a check list; 4. Loose connections, antenna, etc.–establish a check list and check before each flight; 5. Make short flights UP-WIND, until your ship has been thoroughly proven and checked out.

It is hard to say that any one of these items is more important than another, for each is equally important for reliable operation and flying. An old hand at RC can be just as guilty as the newcomer. Be sure to check the airborne radio installation after each hard landing or crash. Batteries can become disconnected internally, a very hard trouble to spot sometimes. Leave enough slack in hookup wires so that vibration and stresses will not break the wire. Spend a little time in making a neat installation, so that all joints and connections are properly made. This also aids in trouble shooting in the field. Be sure to make at least an occasional range check on your receiver and transmitter. Make it with the transmitter you fly with, and not someone else's. Crystals and circuits are not that precise for sharp-tuned receivers. If you plan to fly to a distance of 1/4 mile, make your ground check to at least a distance of 300 to 500 feet. We've found this to be the greatest source of trouble–poor tuning. Check lists are used on every airliner, military and most private planes before take-offs and landings. Seems reasonable to do the same with a model, especially when you have invested time and money.

Quite a few readers have written in requesting information on vibrator power supplies. They state they have a vibrator or a transformer or some other component and would like to have a circuit built around the parts. Unfortunately, a vibrator power supply cannot be "thrown together." Components must be properly matched to assure long life and reliable operation. In view of this, we will present a vibrator power supply in an early issue, with information on how to choose certain components if you desire to use the vibrator or transformer you have on hand.

How many times have you heard a user complain about the NT-6 wet cell not giving him good service? This is a rather common fault, especially since a lot of these cells are not exactly of recent manufacturer. Some users swear by them, some at them. A lead acid cell is composed of lead, sulphuric acid, lead oxide and water and will produce a theoretical voltage of 2.1 volts, when properly charged. Do not be misled by the thought that overcharging will "put a little more into a cell or battery." Overcharging is the principal cause for failure in a wet cell. Overcharging causes the electrolyte (the water and sulphuric acid) to decompose, due to electrolysis, and hydrogen is liberated at the cathode and oxygen is liber-

Stegmaier (Germany) engine installation, showing vacuum pump. "Mudguard" brake. Eight chan.



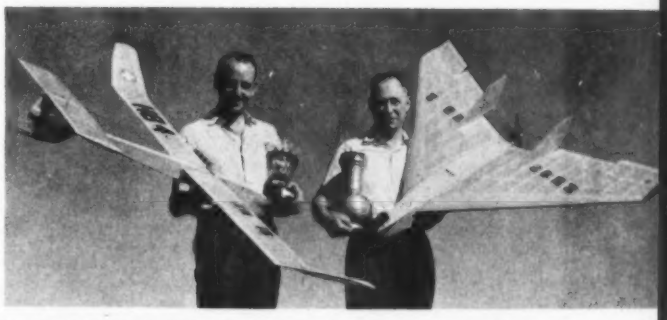
Some excellent craft entered in big Belgian meet, Antwerp, included gliders and, at right, single-channel winner, a delta by Bickel, of Switzerland. He pulsed a rudder on the nose!

ated at the anode. Since these elements are the constituents of water, more water will have to be added at frequent intervals. If water is not added when it should be, excess sulphate forms on the plates, thus also destroying the useful life of the battery. What determines the capacity of a cell or battery? The size and quantity of plates in each cell. The size and number of plates determine the amount of material available for chemical reaction. The rate at which a cell or battery will discharge, or provide high rates of current flow, is determined by the physical size of the plates, which in turn govern the internal resistance of the cell.

What about temperatures with regard to the capacity of a cell or battery? The capacity of a battery to deliver its rated current flow falls off fairly rapidly as the temperature decreases. From a near normal capacity at about 80 degrees F, the capacity drops to about 78% at 40 degrees F, and to about 50% at 0 degrees F. These figures are for fully charged cells, the output decreasing even more for partially charged cells. One of the most common faults in preparing a lead-acid cell for the initial charge is the filling of a cell with the incorrect electrolyte. Either use the solution recommended by the vendor, which is usually obtainable in pint or quart bottles, or have your druggist mix your required needs, using distilled water and sulphuric acid. The specific gravity of the electrolyte is usually in the range of 1.200 to 1.300, depending upon the service conditions. It is preferable to have the specific gravity on the low side as far as battery life is concerned.

However, a higher SG will improve the discharge characteristics, especially at high discharge rates. If the precise electrolyte formula is not known, it would be best to adhere to one with a S.G. of 1.250. This can be obtained by mixing 3.3 parts of water to 1 part of sulphuric acid, the acid having a S.G. of 1.835. Your local druggist can supply this data. Be sure to pour the acid into the water, NEVER pour the water into the acid. Since the volume of electrolyte in a small battery, such as the NT-6, is so small, it is impractical to use a regular hydrometer for measuring the S.G. We would like to point out again that the correct electrolyte is of prime importance since there are a number of types of lead-acid cells. Keep your battery in a charged condition at all times, do not allow it to dry out. If you do not use it in the regular manner for long periods of time, discharge it occasionally and then recharge it.

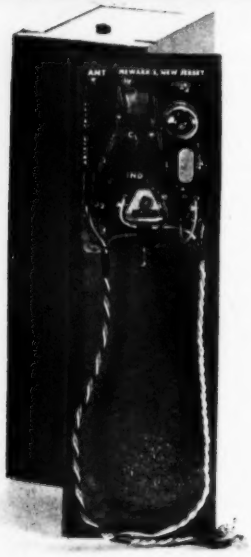
(Continued on next page)



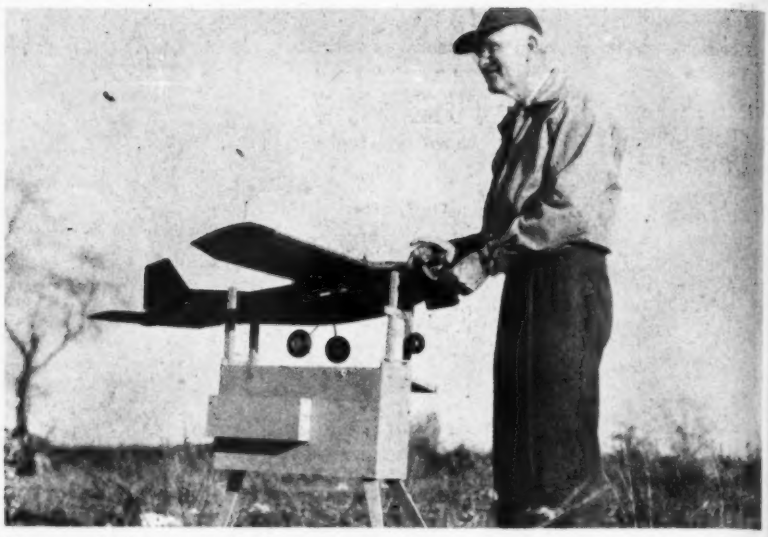
Yet untried in contests in the U.S. is a glider event. Ernest Klauser, Switzerland, took first in "European RC Nats." Bickel, right.

In Europe, B. Gobeaux, Belgium, kneeling, is the man to beat. His .60-powered 3-channel model, is extremely fast and maneuverable.

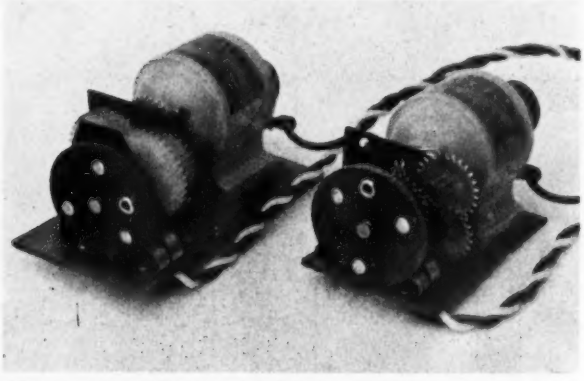
Hemsley, England, took third with 10-year old model with Anderson Spitfire. Hemsley holds control box; RC expert, Redlich, kneeling.



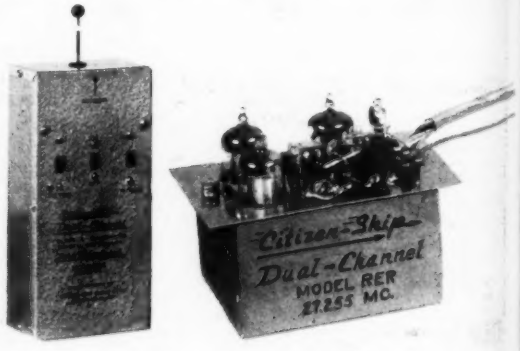
Aristrol MOPA transmitter uses both halves of 3A5. "Works" on front cover plate, shown.



Never one for bending his back to crank and adjust, or for toting tools, batteries and prop in his pockets, is Jack Billings, the chap who started this RC Field Box business. Second the motion!



Servos, anybody? DeBolt 3P3NX, left, and 3P3N, good for engine, auxiliary controls. Give six distinct positions. Unit on left, 3V motor.



Welcome addition, economical two-channel outfit by Citizenship. Called Dual-Channel, two controls worked easily on hand-held X-mitter.

While on the subject of batteries, it might be well to mention that the dry type of cell or battery can be rejuvenated to a certain extent. In this type of cell, the carbon-zinc construction cannot be recharged in the normal sense. When the cell is discharged, the zinc dissolves. This action leaves electrons behind, which repel one another along the external path, or load, to the carbon pole. During use, hydrogen gas is formed on the carbon rod, or positive anode. Even though deploring agents are used in the electrolyte mixture, it is the formation of hydrogen gas which tends to 'run down' the cell during use. Allowing the cell or battery to stand for a period of time between discharge cycles allows the hydrogen to dissipate. This action then allows the cell to produce a higher voltage upon being reused. The so called 'recharging' of a dry cell apparently acts to further remove excess hydrogen. For best results, it is highly desirable to inject a slight amount of AC on the DC charging voltage. A dry cell is no longer usable when the zinc is depleted. Excess hydrogen has formed to the point of fracturing the container, the electrolyte 'mix' has dried out due to storage at too high a temperature, or the current drain has been so high at to 'ruin' the action of the mix. For best results, store your dry cells or batteries in a low temperature (not below 35 degrees F) and try to alternate your usage of them between two or more sets.

The Flying Bisons Second Annual RC Meet, held near Buffalo, New York on July 7th and 8th, looked like a Junior Nats, says Hal deBolt. Of the 50 odd fliers at the meet, a considerable number were multi-channel fans. Schmidt and Bramco 5- and 6-channel reed units were well represented with practically no crackups due to radio failure. Looks like the reed equipment is coming back strong, now that more stable audio circuits have been developed for the transmitter. Several fliers on 465mc flew whenever they wished, which proves that more fliers should go to 465mc in order to get in more flying time. As many as 6 5-channel Cruisers were spotted on the 'line' at one time.

Babcock Models, Inc., announces the appointment of Charles (Chuck) Hollinger to the position of Chief of Design. Dick Schumacher stays on as Consultant for model RC work and between these two men it looks like Babcock Models is going to step up their program.

Miles Wilson, 1324 9th Avenue, Helena, Montana (a traveling salesmen no less) has really been bitten by the RC bug. One of his latest ships is the deBolt Equalizer which is powered with a Cub .19 and which has a wing loading of 12 oz/sq. ft. Radio equipment is by CG, using their three-channel transistorized reed receiver. A deBolt MCE actuator operates the elevator and Babcock Super Compound, which in turn (*Continued on page* 41)

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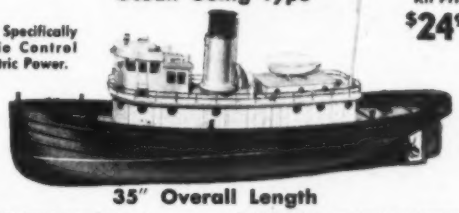

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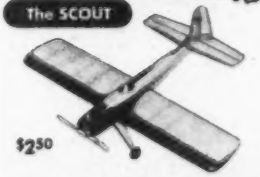

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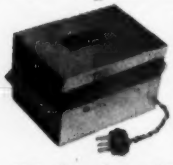

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Belgium

Each year, about this time, we are able to give the results of the King of the Belgians International Cup contest for radio-controlled models. The event is now regarded as the most important RC contest in Europe and, this year, attracted entries from seven countries. The meet actually embraces three RC events. In addition to the premier award, which is for multi-channel models, there is a separate class for single channel and one for towline sailplanes.

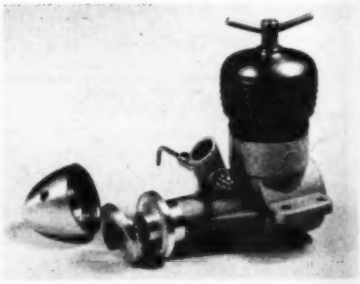
Once again, Belgian expert Jean-Pierre Gobeaux gave a convincing demonstration of precision flying, including loops, inverted flight and rolls, to win the multi event. Once again, too, his perennial rival, Stegmaier of Germany, took second place. Yet another repeat performance, but of a different kind, came from Lichius of Germany when, as last year, he crashed his very beautiful Cessna 180 while inverted. Britian's Ted Hemsley took third place. In this event, Veenhoven, the Dutch Typhoon engine and RC manufacturer, had a model equipped with the Typhoon pneumatic servo system first described in the June Foreign Notes. It was not flown, however.

In the single-channel and glider events, the Swiss contingent had overwhelming success. Bickel took first place in the power event with, remarkably enough, a delta wing pusher and an extremely good score. Fellow Swiss, Setz, took second place flying a Funk-Boy, a conventional, 63-in. cabin job of German origin designed by Werner Kruse. In the glider event, Klauser, Huber and Schmidt, all of Switzerland, took the first three places.

Holland

Another notable European contest which, as with the international RC meet just described, does not enjoy world championship status, but which, like the Belgian event, has become recognized as the most important of its type, is the International Flying-Wing contest, this year held for the fifth time, and at Terlet, near Arnhem in Holland. Teams from six countries attended.

This year, the main event, which is for tailless towline gliders, resulted in a victory for Great Britain, (to the surprise of everyone who regards this type of model as a Continental specialty). R. Delves, proxy flying for F. C. Smith, took first place, followed by W. Graf of Switzerland and G. Weber of Germany. The other Britons took fourth, fifth, ninth and twentieth places and, on the strength of this, also won the team award, in front of Germany, Holland and Sweden.



Best construction from East Germany is shown in Schlosser .15. Spinner design is unusual.

Models, while differing widely in size, followed the basic layouts seen in previous years' contests; namely, high aspect-ratios and no fuselages beyond the occasional use of a small pod.

Great Britain

Most interesting news item concerning motors is of an entirely new engine by Norman A. Long, designer of the Yulon glow engine which was so successful in

Members of the De Oro Modellers Club, Mindanao, Philippines, with some neat models. Two Cessna Bird Dogs, a Mustang profile, a Ringmaster and the Super Ringmaster may be identified.

Czech rubber expert Zdenek Liska with impressive looking Wakefield. It is almost midwing.

the stunt field a few years back. We have been testing a prototype of this motor which, as yet unannounced and unnamed, is a hand made, high performance, .15 cu. in. twin ball-bearing Diesel, in the tradition of the Oliver Tiger and a potential competitor for it.

Like the Oliver, the new Long engine is designed for performance, with cost and weight of secondary importance. Unlike the Oliver, it has disk valve, rather than shaft, induction. The disk is of Tufuol, a reenforced plastic. A novel bypass system is used in which a tapered crankcase bore is combined with four rectangular inclined ports, giving an entry of 65 degrees inclination to the cylinder axis. Construction thoughout is to the highest standards. Bore and stroke are .568 x .600 in. and weight 5.4 oz. Piston, crankpin and wrist-pin are all chromed.

On our dynamometer test, the maximum torque delevered by the prototype was equal to the highest yet reached with an engine of this displacement (equivalent b.m.e.p. 62 lb./sq in.) while the peak b.b.p. speed of 14,750 r.p.m. was one of the highest recorded with a model Diesel. The shape of the torque curve resulted in a maximum output, at this speed, of .285 b.p.h.—one of the best yet with a .15, but which it is hoped to improve to over .30 b.h.p. by increasing b.m.e.p. at the top end. The motor will eventually become available in small quantities in the U.S.

Russia

A good deal of excitement was caused by the announcement a month before the contest, that a Russian team would compete in the World Free-flight Championships alongside entrants from the U.S., Britain, Germany, Holland, Italy and other Western nations, as well as a Czechoslovak contingent. A few days before the event, however, the Russians cancelled their entry. Reason given to Britain's S.M.A.E., organizing body, was that contest would clash with Russian national event.

Japan

The Japanese Eureka model company are well known for their remarkably elaborate scale control-line kits which include pulse-jet powered fighters. (F.84, F.94, Mig-15) and multi-engined transports and bombers. They have certainly excelled themselves with their latest effort. This is a 9 ft. 7 1/2 in. span B-36 which uses six .29's or .19's. Imported into the U.S. by the Eureka Importing Co., 4264 Euclid Ave., San Diego 14, Calif., the kit retails at $89.50.

Philippines

Small but enthusiastic band are the "De Oro Modelers Club", located in Cagayan de Oro City on (*Continued on page* 52)

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Kit PL-25 Cessna 310

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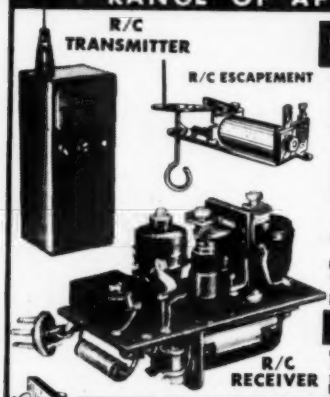

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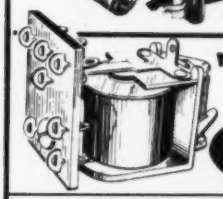

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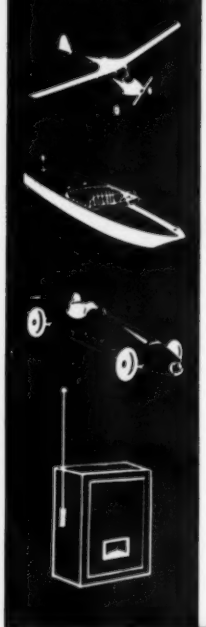

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R-10

ME-109 Stunter

(*Continued from page* 12)

wire is imbedded in one end to keep it from coming out. To build the wing, I start with the flaps. Cut four flaps out of ¼" sheet, then groove them for the wire and the flap horn. Install the tubing and the straps on the wire, then install the horn. Last, cement on the top half of the flaps. This completes the flaps. Be sure to cut the hinges free—it can't be done later. Put slits in the ¼" square trailing edge spar, push the straps of the hinge through the slits, leave some gap between the flap and spar, then bend the straps over, cut-off, and file smooth. For further details on this hidden hinge system, see the Spitfire. August '55 M.A.N.

The tapered ribs are made of 17 pieces of 1/16" sheet, all the same height but cut to the exact length as shown for each rib on the plan. Pin into a block following the numbering system on the plan. Carve the block from the no. 1 outline to the no. 17 outline, unpin and square up the front third of each rib. These ribs will be the exact size needed. The airfoil is a bit different, in that the maximum thickness is at 25% and is always a constant distance from the trailing edge. This gives it excellent recovery from tight maneuvers, Be sure to cut out the lead-out wire holes at this time. Cement ribs to the rear spar and install the ¼" leading edge. Next comes the trailing edge sheet. Bevel it to clear the flaps as it overlaps the flaps ¼". At this point, check the wing for wraps. Install the leading edge sheeting and the bellcrank system. The vertical 1/32" sheet is the secret to the strength of the wing. One such wing survived a vertical dive into the ground. It is also a good idea to put 1/16" sheet over all splices. The rest of the construction is straight forward.

I put Herman the German in the cockpit to do the flying for me. The model must be fully covered with silk. Brush on two or three coats of clear nitrate dope to fill the silk. Spray two coats of clear butyrate, followed by four coats of black Aero Gloss. Use rubbing compound after the last coat of black. This finish will turn into a glossy black mirror. The insignia are cut from white Trim Film.

My model weighed 33 ounces ready to fly. The plane is an exceptionally easy one to fly. Both beginners and experts have flown it and all like its ease of handling. If held in neutral, it will use a quarter of a lap to get off, yet can be hauled off in three feet if need be. In the air, it is responsive without being jumpy. This plane is a hot contest ship and has never failed to place in any contest entered! One judge told me that this plane did such tight triangular loops that they added up to only 170 degrees!

MAN at Work

(*Continued from page* 7)

claring that, since it isn't the danger, it must be the noise that prevents this happy solution.

The classic comment: "If manufacturers could hear the complaints on noise . . . sure mufflers would make an appearance!" The fact is that several manufacturers produced mufflers. A second fact is that the modelers were too stupid to use them, thinking it better not to fly, to collect stamps, than to give up the mad, monotonous buzzing that drives innocent people daffy. Let's take the bull by the horns. Which daring manufacturer will be the first to make an engine *with* muffler integral? That would be something the dealers

could plug—assuming they understand the model airplane business. A quiet engine is a positive talking and selling point, not something to be afraid of. All automobiles have mufflers—picture the uproar otherwise. Sure, some power—and much noise—will be lost on a muffled engine but who cares when survival of flying near cities is at stake?

• • •

Carl Miller, Nashville dealer who treks to the Nats—and builds nifty models to boot, says Nashville Air-O-Bats have 35 members, fly all types of models. (427 Deaderick St., Nashville, Tenn.). . . Bob Rensch, Findlay Model Airplane Club, c/o R & M Hobby Supplies, 1121 Broad Ave., Findley, Ohio, says the ukie boys in club became scale minded after an unencouraging contest record. So, Jim Bond took a first at Junior Air Races, Cleveland, with a B-29, Vince Mariani, a third with Berkeley J-3 Cub. Ronnie Cramer has a nice DC-3. Maybe more clubs should try scale? . . . reading results of California Free Flight Council meet last summer at Mather Field, Sacramento. June Dyer donated free lunches to the contestants. June has done a job for modeling for nearly as many years as we can remember. You can call it devotion beyond the call of duty . . . John Bort, Beloit, Wisc., says Consumers Union, Mount Vernon, N. Y., has a strong binder, which can be used for holding back copies of MAN, for $1.25. . . Bill Millice, Hamilton, Ohio, reports idea of club member, Chuck Koehler, to allow free flighters three hops with a choice of engine run from 10 to 25 seconds. Final points figured by dividing total time by time of the three engine runs. Under 8 and over 25 seconds run unofficial. Since winner will have closest to a perfect three minutes on each flight with a minimum engine run, it is argued that lost flights will be cut down . . . 16th Edition Civil Air Regulations & Flight Standards for Pilots, announced by Aero Publishers, 2162 Sunset Blvd., Los Angeles 26, Calif. This excellent 146 page book will set you back $2.00 . . . American Hobby Centers Giant Hobby Catalog, for 25c, is a massive compilation of available items. It is particularly noteworthy for the vast amount of pictures and illustrations, which make it a worthwhile reference as well . . . mechanically weak connections inside some new flashlight batteries, though OK for flashlights, are poison in RC. Reliability! What's that?

Radio Control News

(*Continued from page* 36)

operates a Citizenship SN (for throttle), and also works the rudder. Miles uses 22½v on his receiver instead of the recommended 30v. We have used ours on 22½v and the operation is perfectly normal. This 52-ounce ship takes off straight as an arrow with no assist from the controls. Since Miles is miles and miles from other RC fans (just had to get that in), he'd appreciate hearing from someone in his area. He has won quite a few RC contests in the far northwest area and therefore would probably have some good advice for newcomers in his area.

For the past 6 to 8 months, we've tried to put across the idea that the filing of an FCC registration for RC transmitters is important. It is quite possible that in the near future we will have additional frequencies for RC use. However, these will not come about unless it can be shown that the present 27 and 465mc spots are being operated within the regulations. In view of this, let's make a concentrated effort to see that each individual files

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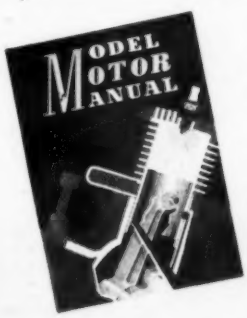

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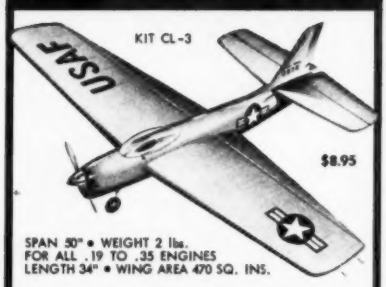

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Jetco presents the most beautiful stunt model of all time – the jet-styled SABRE STUNT, which ace-flyer Jose Saduni flew to second place in Open Stunt at the '55 Nationals. Internationally famous designer Bill Dean developed the kit version, which sets a new high in prefabricated easy-to-build construction (even the L.E. sheeting is die-cut!).

Every building stage is shown on the TWO big plans – plus diagrams of official AMA acrobatic maneuvers. The kit includes 20 die-cut panels; shaped leading and trailing edges; formed wire parts; canopy; decals. No finer stunt kit has ever been made available to the American builder.

Capt'n Frank Van Buren developed this 24" long cabin craft specially for Jetco. Ideally suited to radio control, with detachable cabin top. Takes electric or glo outboards.

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Flagship of the famous Thermic glider fleet, the Internats A.2 NORDIC is a favourite from coast to coast. Features sturdy, yet simple prefabricated structure. Holder of the new Sen. Nordic record – set at the Calif. State Championships.

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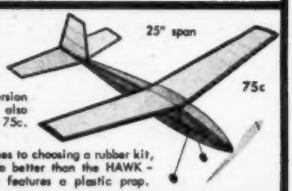

Low wing version FALCON – also available at 75c.

When it comes to choosing a rubber kit, you can't do better than the HAWK – which even features a plastic prop.

If your dealer is out of stock of any Jetco models, write to C.A. Zaic Co. Inc., including 10 cents postage & packing for kits up to $1.00 – 25 cents for all kits above $1.00

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an FCC registration form for either or both 27mc and 465mc, as the case may be. Yes, you need a separate permit for 27 and 465 mc.

This month we have quite a bit of 'hot' info from European RC flyers and contests which were held in June and July. E. Kreulen, Holland reports on the Antwerp RC Contest held near Antwerp, Belgium on June 16th and 17th. There were 7 entries in multi-channel, 18 in single-channel and 9 in the RC glider event, all of which were single-channel. First place in multi-channel went to Mr. B. Gobeaux of Belgium with a total of 1703 points. Radio was similar to Babcock 3-channel unit giving rudder and elevator control, and the model, powered with a .60 glo engine, was very fast. K. H. Stegmaier of Germany took second place with his pneumatic control outfit. The radio was an 8-reed unit, as shown in previous MAN columns. A photo shows the 'mudguard' type of front wheel brake, which is actuated by the pneumatic type actuators, and which is reliably operated with the 1 to 1½ pounds pull. An outdated and sluggish flying model prevented Stegmaier from possibly taking first place. Third went to T. Hemsely of England, using 6-channel ED reed equipment in a 10 year old model powered by an Anderson Spitfire. Mr. B De Hertog of Belgium garnered 4th place with an old American ignition engine powered plane, and using a novel two-receiver type of control. XFG-1 receivers on 27.12mc and 34mc are used in a pulse-ratio system and simultaneous rudder and elevator control is obtained. Engine speed control or complete cut-off is accomplished by the pulse-ratio function. Fifth place went to Mr. H. Lichius of Germany with his Cessna, complete with a 7-channel reed unit and progressive motor driven self-neutralizing actuators. This actuator is a German development, with the motor driving a worm which disengages when power is removed from the motor, the control then neutralizing with a fast 'click'.

The 1703 points piled up by Gobeaux were out of a total of 2509, and this fine flying was done by a father and son team. In addition to the fine reporting of this event by Kreulen. Mr. J. van Hattum, The Hague, Holland also contributed information and the following fine pictures taken at the meet. The photo shows the first place winner in the multi-channel event, Gobeaux Jr., kneeling. This model is exceptionally sturdy and is claimed to be stressed for 20g's, as evidenced by its ability to pull out quickly from high-velocity dives. Another photo shows 3rd place winner Hemsely, holding the control box, and the well-known British RC expert Honest Redlich, kneeling near the tail of the plane which is a modified 'Cloud Cruiser' designed by Ben Shereshaw in 1937. This multi-channel event was for the "King of the Belgiums Cup".

In the single-channel event we really have an interesting picture of the first place winner. This is Mr. Bickle of Switzerland and his novel Delta model with a pulse-operated front rudder. The radio is a 4-tube unit using subminiature tubes. A super-regen detector feeds two amplifiers, which in turn control the relay tube in an action the same as our two-tuber. This model picked up 587 out of a possible 630 points. Second place also went to a Swiss flier, Mr. Setz with 429 points. The single-channel event was for the "Ministry of Communications Prize". Still another shows the winner of the RC glider event, Mr. Ernst Klauser of Zurich, Switzerland who amassed 369 out of a

(*Continued on page 45*)

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Sal Taibi	Open

Combat with TORPEDO .35

Kenneth Knotts	Jr.
Bruce Brown	Sr.
Riley Wooten	Open

Class "A" Speed with TORPEDO .19

Larry Thomas	Jr.
Phillip Bussel	Sr.
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The closing date of this issue did not permit us to include the names of the many second and third place winners whose planes were powered by Torpedo engines. Watch our future ads for complete listing.

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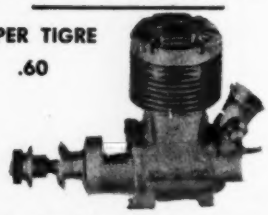
SUPER TIGRE .60



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ELFIN .09 BALL RACE

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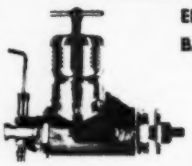

Aeromodeller — A British magazine devoted to these arts recently rated most European contenders for the F.A.I. crown on the basis of some kind of dynamometer test. This Engine, the Elfin .09 Br was rated on the TOP. There have been a few refinements made on this baby since the original version that are now. See the differences?

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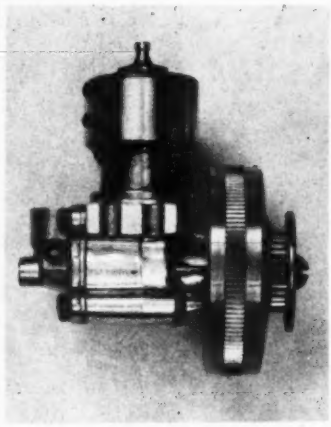


Engine Review

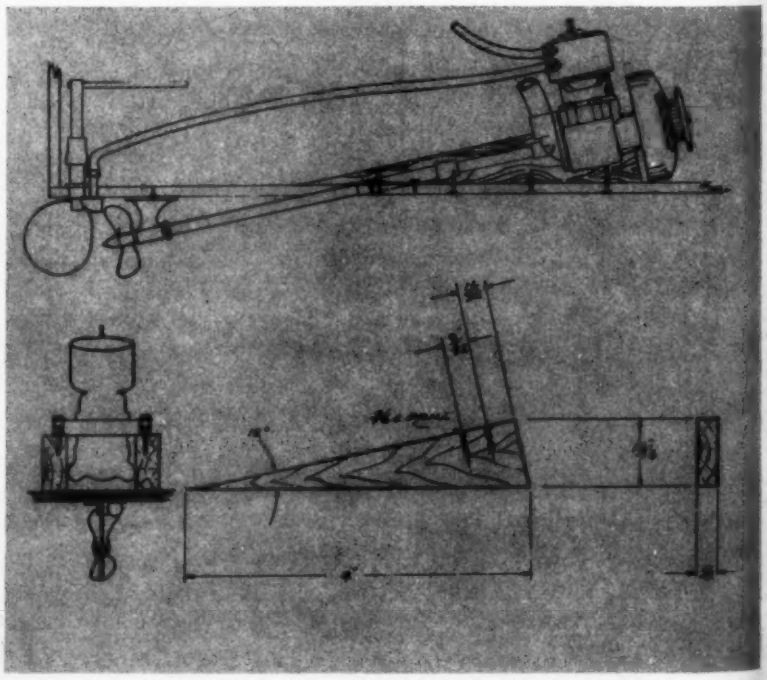
O & R Mariner .049 well thought out marine engine with plenty of performance boosting ideas.

By E. C. MARTIN

The Mariner inboard marine kit gives its owner something to shoot for in his building. The appearance of the kit bespeaks genuine quality in a dignified manner, which cannot miss those who delight in tiny mechanisms and shiny precision. If you have ever taken the back off your watch because you like to see the wheels go round, the Mariner engine will evoke the same pleasure.

The kit contains everything required to propel the boat except fuel tank, starting batteries and plug leads. A 24 carat gold plated rudder assembly and combination wrench are thrown in together with comprehensive installation drawing and instructions.

The engine itself is basically the O&R .049 Midjet already described in these columns, but with a power take-off from the rear of the crankcase, and a water jacketed cylinder barrel and flywheel in place of the prop driver. Especially interesting is the power take-off as it is supported in two bearings with the center portion actually rotating in the induction tract, and consequently abundantly lubricated at all times. Being at the back of the engine which, for efficient power transmission, must aline with the propeller shaft, and thus be tilted, the power take-off can be placed low in the boat, and the length of shaft necessary to reach the propeller at the customary 12-degree angle is thus kept to a minimum. An undesirable length of shaft rising from the shaft tube and stuffing box in the (*Continued on page* 49)



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THE "TRAINER" .09 TO .15
SPAN: 48"

"LIVE WIRE"

The name signifies PROVEN BEST for all R/C flying! Flown by beginners and experts alike, noted for performance, simple, rugged construction and their long list of contest laurels. You'll have the BEST with a LIVE WIRE!

THE 1955 NATIONAL CHAMPION!
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THE MOST POPULAR R/C MODEL!
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SPAN: 34"
THE "KITTEN"
FOR 1/2A R/C FLYING FUN!
$3.95

THE "CHAMPION"
R/C SCALE AERONCA
$10.95
SPAN: 56"
.15 TO .19 ENG.

MULTI OR SINGLE CONTROL
SPAN: 65" .19 TO .29 ENG.
PAY LOAD: 2 1/2 LBS.

Live Wire models offer the finest in R/C design with exceptional wind penetration, wonderful stability and positive maneuverability combined with simplified construction. All kits completely pre-fabbed ready for assembly. Only fine PREMIUM QUALITY materials are used. Included are dural gears, R/C hardware and FULL SIZE plans with instructions showing COMPLETE R/C INSTALLATION!

ENGINE CONTROL ACTUATORS

$11.95

NOW! 2 GREAT NEW MULTI-SERVOS FOR AUXILIARY CONTROLS!

Both models have greatly improved action. More power, more control movement, 6 control positions and NO time element for keying. Usable with any engine throttle or auxiliary control.

3P3NX ➡
A 3 volt type with Nylon gears for multi-channel use. Requires one relay for operation and power is 2 lbs.

⬅ 3P3N
A 1½ volt servo for single channel. May be used as a secondary servo operated by a 3PN type. Power is 1 lb.
PATENT PENDING

NEW MODEL 3P3N

NEW MODEL 3P3NX $14.95

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"Home of Design-engineered Models"
WILLIAMSVILLE NEW YORK U S A

SEE YOUR HOBBY DEALER
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Radio Control News

(*Continued from page* 42)

possible 510 points. The Swiss also took the next 3 places in this event, which came under the heading of "Ministry of Health Prize". It looks like government agencies get behind the modeler in Europe.

Several of the European and British RC fliers have voiced their opinion that they would like to see an international RC event on a scale comparable to the Wakefield event. The photo shows the types of ships, and their builders, that a US contestant might encounter. This photo is of the Swiss team, taken at the RC event in Antwerp. Mr. Klauser states that one of the most successful and reliable units in use consists of a transistorized receiver and 'flutter steering'. Perhaps we'll have more on this for you in a later column.

One of the latest RC news sheets to reach us is the Carrier, published at 3660 Telegraph Avenue, Oakland, California (quite apropos). Dale Root sent in the information and we'd like to find out the name of the Editor. A few choice excerpts from the July issue include a dispute as to the most spectacular maneuver of the July 4th flying session. Was it the 500-foot full-power spin by Mason Booth, with everyone standing up and waiting, . . . for the pull-out that never came, or was it the 50 foot inverted pass over the field by Bob Leininger, which terminated in a snap-roll into an orchard area? Three consecutive outside loops were made by Don Zacharie using single channel only. Looks like another 'hot' west coast group will be making the news now.

From Ralph Corelle, League Secretary of the RC League of North Carolina, 834 Fairmont Avenue, Salisbury, N.C., writes regarding the flying session held on July 22nd. There was a beautiful Cessna 170 built and flown by Herb Capes of Greensboro. Using a Fox .19 and a CG Electronics 2-channel reed outfit, this ship was said to have been a lovely sight in the air. Bob Rector of Salisbury was flying an 'Over & Under', using a Torp .23 and a Schmidt 5-channel unit. A high-speed stall is blamed for the unwanted snap rolls during inverted flight. Otherwise its flights are perfect.

Should you ever be down Durham way, and out flying with Emerson Ford, don't get the impression that they grow big horseflies or mosquitos and then try to swat one. Could be the 24" job by Emerson, rolling on the way up from its dive pull-out. This 22 ounce wing loading job is powered by an .09 diesel and uses a gas receiver. Maybe someone told him it couldn't be done, and he did it.

In keeping with our program to inform the newcomer what to look for, as well as providing items of interest to the more advanced builder, we'd like to repeat the information on the Broadfield RC Field Box, as manufacturered by Broadfield Air-Models, Ashland, Mass. Although quite a few of these units are used by RC fliers in the east, there is no reason why fliers in the rest of the country shouldn't be let in on a good thing. This plywood box, measuring 7" x 12" x 20¾", has drawers and compartments for storing the essentials for your flying, and is provided with folding legs which places this unit at working height so that there is no need to stoop or kneel when working on the plane or starting the engine on smaller planes. Built-in supports are adjustable for various fuselage sizes. Once you've seen and used one of these Broadfield RC Field Boxes, you'll

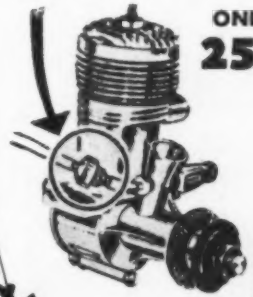
(*Continued on page* 48)

FUEL FILTER-EQUALIZER

This nylon filter with 80 mesh Monel screen is ideal for all model engines.

ACTS 2 WAYS:
(1) Cleans the fuel and prevents clogging of lines and needle valve . . . (2) Breaks up the air bubbles to equalize the flow of fuel to the engine.

ONLY 25c



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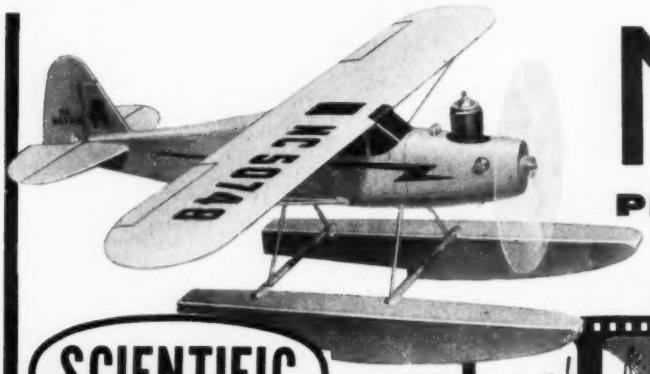

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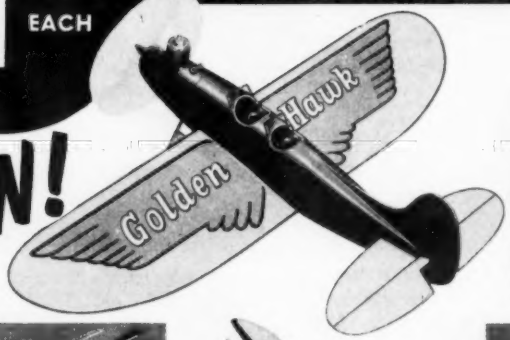
2 BRAND NEW MODELS **$1.95** EACH

TERRIFIC FUN! TAKES OFF AND LANDS ON WATER!

You fly this exciting seaplane U-Control (it's a cinch, too) from any pond, lake or even a small puddle. And no wet feet! You're standing on the shore all the time. The film strip above shows some of the terrific flying fun you can have with this new model. You'll love the way it taxis along the water . . . the exciting moment when it's airborne . . . the all-around flying performance. The model is all prefabricated . . . with a carved balsa fuselage and all parts cut or shaped for quick, easy assembly. A mere $1.95

BOTH MODELS HAVE AN 18" WINGSPAN • POWER WITH GAS ENGINES .035 TO .074

NEW!



A new flying sensation . . . our new

C-O-L-O-R-F-U-L

Golden Hawk

Here's the most C-O-L-O-R-F-U-L flying model you can imagine! The giant size 3-color decals (included) make this U-Control flyer a real dazzler. Note the B-I-G-G-E-R, expansive wing . . . here's much more model for your money, too. In performance, it's simply terrific! And so easy to assemble, it practically falls together from the all-prefabbed kit (carved fuselage & all parts cut or formed). Priced at a tiny $1.95

PIPER CUB CRUISER $1.95
SPAN: 18" For .035 to .074 Eng.
All prefabbed, carved balsa fuselage model. It's a model plane that really flies. Easy to fly.

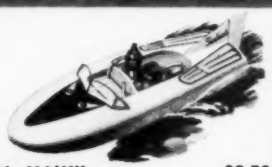
SPORT RACER $1.50
SPAN: 18" For .020 to .074 Eng.
Good U-Control performer at a remarkably low price. Completely prefabbed kit. Easy to fly.

MONOCOUPE 90A $1.95
SPAN: 18" For .035 to .074 Eng.
Scale model of America's favorite private plane. Prefabbed with carved balsa fuselage, cowl.

LITTLE BUCKEYE
"1/2A" Eng., Jetex, Elec. Motors
Low cost speedboat thriller. Prefabbed, carved balsa hull, brass metal fittings.

CESSNA "BIRD DOG" $1.50
SPAN: 18" For .035 to .074 Eng.
Scale model of USAF observ. plane. Big value kit . . . prefabbed with carved fuselage, etc.

HALF-PINT RACER $2.95
LENGTH: 9" For 1/2A" Eng.
Scale model speeds over 40 m.p.h. Direct motor drive. Prefabbed, carved balsa hull, brass metal fittings.



SEA HAWK $2.50
"1/2A" Eng., CO_2 or Elec. Motors
Has a 12" carved balsa hull, brass metal fittings, etc. Aeronautical design.

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SPAN: 18" For .035 to .074 Eng.
Scale model of world-famous plane. Prefabbed with carved balsa fuselage, cowl.

AMERICAN BOY $1.95
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Our U-C version, the biggest rubber model airplane in the world. 100% complete.

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Deluxe U-Control model. 100% complete—with carved balsa fuselage, wings, etc.

LITTLE ACE $1.95
SPAN: 18" For .020 to .074 Eng.
For power racing or sport flying. 100% complete with formed fuselage, prop, metal cowl.

LITTLE DEVIL
SPAN: 18" For .020 to .074 Eng.
Economically priced U-C model. Prefabbed parts include: formed balsa fuselage &

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U-C model of this sensational 600 m.p.h. jet. Flies like a dream. Prefabbed, carved fuselage.

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nd demon! Semi-scale with our new ' design. All prefabbed. For R/C too.

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SPAN: 18" For .035 to .074 Eng.
Our extremely popular scale model of the AT6 Trainer. Carved balsa fuselage, etc.

EXPRESS CRUISER $1.95
LENGTH: 18" For Any OUTBOARD Eng.
Chris-Craft cabin cruiser model (semi-scale) with our new 'Waterama' design. All prefab kit.

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SPAN: 18" For .035 to .074 Eng.
Terrifically colorful all around sport flyer. Practically puts itself together. Prefabbed.

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AN: 18" For .035 to .099 Eng.
-out ½A stunt plane over . . . with a carved fuselage, etc.

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Scale model of this famous trophy race champ. U-Control. All prefab, w/carved fuselage, etc.

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18" Hull. Rubber Power Included.
Actually operates like a real sub. Submerges! Surfaces! Cruises! Prefabbed, carved balsa hull.

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SPAN: 18" For .035 to .074 Eng.
U-Control model of this grandaddy of Trophy Racers.' Super-prefab. Profile.

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SPAN: 16" For .020 to .074 Eng.
Betty Skelton's (Pitts Special) championship stunt flyer. Highly colorful, all prefab model.

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SPAN: 18" For .035 to .074 Eng.
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Our exclusive aeronautical design. Prefabbed model has 19" carved balsa hull, etc., etc.

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Scale model of first U.S. supersonic jet fighter. A terrific flyer. All prefabbed kit.

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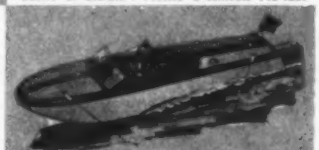
LENGTH: 20" BEAM: 8"
Sleek new speedboat for OUTBOARD engines. Prefabbed, w/ genuine mahogany veneer hull.

LITTLE SPITFIRE $1.19
SPAN: 18" For .035 to .074 Eng.
Fly-it-yourself version of famous hero of the 'Battle of Britain'. Profile U-Control. Pre-fab.

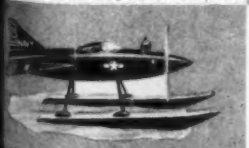
CHCRAFT "17" $2.95
AN: 16" For .020 to .074 Eng.
prefabbed model has carved balsa formed balsa wings, metal cowl, etc.

RIVIERA $3.50
For "½A" Eng. or Electric Motors
Authentic Chris-Craft replica with 12" carved balsa hull & brass fittings. All parts finished.

FIREBIRD RACE CAR $1.89
LENGTH: 18" For .035 to .074 Eng.
New, futuristic race car that speeds to 60 m.p.h. It's prefabbed, 4 rubber wheels, carved body, etc.



BUCKEYE JR. $3.95
LENGTH: 14" For .020 to .074 Eng.
A "beaut" of a speedboat. Prefabbed with a carved balsa hull, brass fittings, etc.



T" SPEEDBOAT $1.89
For ½A Engines .035 to .074
speedboat, replica of U.S.N. Convair . All prefab model. Exciting to race!

LITTLE MERCURY $1.50
SPAN: 18" For .039 to .074 Eng.
U-Control carved fuselage model. It's completely prefabbed. A cinch to assemble.

BUCKEYE JR. CABIN $3.95
For "½A" Eng. or Electric Motors
Here's our sleek cabin cruiser, with a roomy cabin, 14" carved balsa hull, etc., etc.

LITTLE MUSTANG $1.95
SPAN: 18" For .020 to .074 Eng.
Famous escort fighter model. Prefabbed. Features carved balsa fuselage, formed balsa wing.

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Precision engineered—non-corrosive, all metal construction, this handy Austin Craft fully guaranteed fuel pump is made to fit the needs of all models using fuel engines. Perfect finger tip control over fuel flow at all times. No after cleaning required.

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never be without one. Pack up your batteries, transmitter, fuel and other RC necessities in the box, carry it to the field and then set it up as a portable workshop.

Polk's Modelcraft Hobbies, 314 Fifth Avenue, NYC now stocks the new Distler Aristo-Rev motor, made for operation on 1½ volts. The same size and weight as the familiar and popular 3-6 volt size, this new motor consumes about the same amount of power as the earlier model and thus will run for a considerable length of time on a medium-size flashlight battery or several pen-cells connected in parallel. Also from Polk's comes a new series of 2.1v wet cells. These are brand new and are not surplus units. We've only seen the engineering samples so far but they look good and preliminary checks show they should hold up very well. Prices will range from about $2.95 to $5.95, depending upon the size and capacity. One size is novel in that it is 1/3 the size of a surplus NT-6 battery. In this way, you can have 2, 4 or 6 volts in a compact size, the 6 volt unit being the size of a conventional NT-6 battery.

If you have a soldering or silver soldering problem which an iron will not handle, perhaps you should investigate the small hand-held propane torch, sold by various hobby shops. Complete with a gas cylinder for $1.95, this torch will provide a flame hot enough to do silver soldering of small parts. Extra gas cylinders are two for 39 cents.

Photos show the new Citizen-Ship dual-channel transmitter and receiver. The model RER receiver weighs but 7 ounces, has a low idling current, with a rise in current on the desired relay. The model REX transmitter, operating on 27mc, gives left or right, or any other sequence, instantaneously as the tone switches are operated. We've seen this equipment in operation and can vouch for its reliabilty under flying conditions. The units sell for $39.95 each at your local hobby dealer or direct from the factory of Citizen-Ship Radio Corporation, 820 E. 64th Street, Indianapolis, Indiana. This equipment is built to the same high standards of quality as the famous 465mc and 27mc equipment built by this company.

Those of you who are familiar with the deBolt Multi-Servos, will be glad to hear of their new models shown in the picture. On the left is model 3P3NX and on the right is model 3P3N. Basically, both units operate the same, and are ideally suited for engine speed control, or any other manner of auxiliary control you wish. Each model gives 6 distinct control positions, with the added feature of more control movement than available with the standard types of Multi-Servos. The 3P3N, selling for $11.95, operates from 1½ volts and is a fine companion for the model 3PN servo, used with single channel radio. The 3P3NX model, selling for $14.95, features nylon gears, a 3-volt motor for greater power and reliability and is the perfect match for the MCR and MCE multi-channel servos. Both units feature no time element during the keying cycle. The addition of these two new servos greatly add to the flexibility and versatility of the fine line.

A photo shows the new Aristrol MOPA transmitter as marketed by Polk's, and which was described in several earlier columns. Shown is the rear of the front cover. The etched wiring conductor pattern and amplifier tuning coil is on the reverse side of the chassis. The 3A5 tube serves as an oscillator (one half) in the 13mc band and the other half of the tube

(*Continued on page* 50)

SAFE! BEAUTIFUL! *Clear Plastic*

15 EACH
2 for 25c

Tough, high flex plastic, engineered for maximum thrust at all speeds. Designed to look like scale propellers . . . and priced low enough for flying too!

No hidden AIR BUBBLES! We supply only in "clear" plastic . . . full visibility thru and thru protects you from hidden flaws. **No hidden FRACTURES** from unlucky landings. Factory safe-tested at 25,000 RPM!

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2-BLADE: Right and left hand—6-3, 6-4, 5½-3, 5½-4 ready now.
3-BLADE: Right and left hand—6-3, ready now. 6-4, 5-3, 5-4, 7-3, 7-4 (soon)

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3 Models specifically designed for beginner or expert

Included in each kit is a large tube of Ambroid cement and detailed instructions for starting a balky engine.

GM-4 PROFILE TRAINER II
$4.50
for engines from .14 to .19

America's most Popular Gas Models!

GM-14 PROFILE TRAINER I
for engines from .049 to .099
$3.25

EXTRA FEATURE!
Guillow's "Best Flying Combinations" . . . no guesswork when choosing needed accessories

THE RIGHT ENGINE
THE RIGHT PROP
THE RIGHT FUEL TANK

If not available at your Hobby Dealer send direct to factory adding 25c packing and postage in U.S.A., 40c outside U.S.A.

GM-15 PROFILE TRAINER III
for engines from .19 to .36
$5.95

PAUL K. GUILLOW Inc.
WAKEFIELD MASS.

Engine Review

(*Continued from page* 44)

bottom of the boat to the drive coupling is also avoided, and shaft whip thereby minimized. A further great advantage arising from this rear drive is that the flywheel then comes in front of the engine as installed in the boat, and consequently, owing to the tilt, has space available for considerable size and weight, and is easily accessible for starting by cord or the fingers. Had the flywheel been mounted at the rear of the engine in the conventional way, a similar diameter would have dictated a higher crank-center position, a higher boat center of gravity, a longer prop shaft, engine location farther forward in the boat, and general difficulty in winding the starting cord. Thus, in this one feature alone, the Mariner has a great deal to offer. The heavy flywheel is a considerable aid in quick starting, and damps the power impulses to give steady vibrationless torque at the propeller.

The means of coupling the prop shaft to the engine is highly efficient while being delightfully simple. The end of the shaft is flattened and engages in a slot in the power take-off shaft within the bearing. The edges of the flats are radiussed to prevent cutting of the bearing, and the width across these edges is the same as the diameter of the shaft so that the coupling is therefore held concentric and free of play and chatter at all times within the bearing, and as long as the installation is carried out to the instructions with due attention to alinement, there will be no power loss at this point.

The cooling system of the Mariner is a further development of the arrangement of jacketed fins as employed on many European Diesels. The top and bottom cylinder fins are flanges of sufficient thickness to carry the cooling jacket by means of a water tight press fit. The intermediate fins are thinner, and have passages notched in them in alternating positions around the cylinder, so that the water comes through the inlet connection and passes around the cylinder below the first intermediate fin until it reaches the passage past the fin. It then doubles back below the second fin to the passage on the opposite side, and so on to the next until it reaches the outlet connection. By this means the water comes in intimate contact with the entire cooling surface of the cylinder and short circuiting and hot spots are avoided. The actual circulation of the water is induced by the location of the tiny gold plated pick-up scoop just behind and to one side of the propeller. The water is driven into the scoop by the blade tip, regardless of whether the boat is in motion, and passes through transparent plastic tubing, of which a generous length is included in the kit, to the water jacket inlet, and then from the jacket by more tubing over the side of the boat. The pick-up scoop is very small and unlikely to cause any noticeable drag to the progress of the boat.

One of the problems inseparable from small inboard installations is that of disposing of exhaust gases and, more important, of preventing the engine from breathing its own exhaust with a consequent power loss. Oxygen is the one element which, by its quantity, ultimately governs the power output of any conventional internal combustion engine, and the sole object of big ports, big intakes, nitro fuels, superchargers and the multiplicity of carbureters often seen on hotrods and racing cars, is simply to get more oxygen into the cylinder, and not, as is often supposed, more fuel. (*Continued on page* 53)

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From the finest *fuel proof* cements that give you strong, sturdy construction, to the final coat of *fuel proof* Dope for a brilliant, trophy winning finish AERO GLOSS products on your workbench assure your model of lasting beauty and protection.

Aero Gloss Fuel Proof Cements
Now—FULL OUNCE 15c
C-77-15 *Strong*
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Aero Gloss Fuel Proof Dope In Jars, Cans and Spray

Winning Modelers in Every Event
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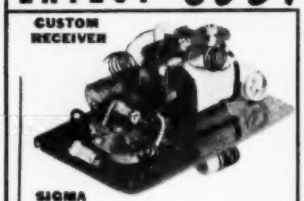
LATEST "CUSTOM MIDGET" RADIO



CUSTOM TRANSMITTER BOX INCLUDED

ALL THREE $8.98

RECEIVER TUBE "IDLES" WHILE RELAY REMAINS IN UNENERGIZED STATE. (saving tube and battery)

TUBE CURRENT INCREASES and RELAY BECOMES ENERGIZED ONLY WHEN TRANSMITTER IS KEYED

SHOULD RECEIVER or TRANSMITTER FAIL WHILE IN USE MODEL COMES IN RATHER THAN FLYING OUT OF SIGHT (This new type of "Fail Safe" operation fully explained in our instructions)

Fully Re-Designed "CUSTOM RECEIVER" weight under 3 ounces including 10,000 ohm relay (relay included) plus Silver Ceramic Trimmer, midget resistors & condensors, Nylon Coat Coil wire etc. Uses one X F G I Tube which IDLES while relay not energized saving Tubes life, Batteries etc. "CUSTOM TRANSMITTER" 27 M C Exam. Free Band with pre drilled base etc. Transmitter box only 4 1/8" x 5 3/4" (Box Included) may be hand held or placed on Field. Has range of 1 mile or more. Full Drawings and instructions included. "CUSTOM ACTUATOR" of new magnetic principal operates both rudder and elevators or rudder alone off battery supply, no rubber used for Boats, Aircraft, or Cars of small 1/5 A size up to large 6 ft. models. You do not have to be a Radio Expert to assemble the 3 units, all parts are tagged and marked to correspond to drawings.

"CUSTOM MIDGET" RECEIVER TRANSMITTER and ACTUATOR..... $9.98 ☐

Also Available "STANDARD MIDGET I" Radio kit, this group of 3 units, same design as above, same Relay, Same type Transmitter and Actuator. The difference from above is the Receiver weight which is greater (slightly over 4 ounces) Heavier components used.

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"SUPPLY SOURCE DIRECTORY" Tells where to obtain Relays, Tubes, Crystals, all types equipment low as 1/20th normal prices. $7.00 MERCHANDISE COUPON FREE with Directory..... price $1.00 ☐
"SPECIAL 10 FOOT TRANSMITTER AERIAL"...$1.00 ☐ SPECIAL 10,000 OHM SIGMA RELAY...$2.98 ☐

X F G I tube...$3.50 ☐	0 to 3 Milliammeter...$3.50 ☐	Soldering Iron.....$2.98 ☐	Black Crackel Finish Transmitter Cases	
3-A-4 tube..... 1.00 ☐	0 to 50 Milliammeter... 2.75 ☐	Battery Tester, reads 0 to 2 Volts and 0 to 50 volts..... 2.98 ☐	4" x 5" x 3"...$2.98 ☐
3-A-5 tube..... 1.35 ☐	Both Meters above... 5.25 ☐		6" x 5" x 4"... 3.25 ☐
Keying Switch.. .50 ☐	Peterson 27.255 M C Z-9 Crystal..... 4.85 ☐	Electric Motor 6 volt for Boats 2 to 4 Ft. $8.50 value..... 3.88 ☐	6" x 6" x 6"... 3.50 ☐
Micro Switch... .98 ☐			10" x 8" x 7"... 3.98 ☐
Photo Elec. Cell .98 ☐	Rosin Core Solder, Kesters 3 ounce box.. .50 ☐		Neon Bulbs 15 for 1.00 ☐
Variable Resistor .50 ☐			

25c ☐ NEW and FULLY REVISED Radio catalogue. Shows parts as low as 1/5 to 1/4 the price you normally pay. Also gives more details, more photos etc. of our kits.....25c. **25c** ☐

MODELLERS—Check off each item you wish to order above. PRINT YOUR NAME AND ADDRESS on a separate sheet of paper with above order. Send REMITTANCE IN FULL.

RADIOMODELS, BOX 36, DEPT. M BALTIMORE 6, MARYLAND

O&R NECESSITIES for all leading engines!

Correctly blended SPECIFIC PURPOSE FUELS for each type of engine

ALL CLASS ENGINES

HELLZ FYRE Speed Fuel. Guaranteed fastest fuel yet developed! It's sensitized!
Pint $1.25

O & R AA Glow Fuel . . . For ALL ultra - small engines. Largest selling 1/5 A fuel.
Gal. $4.95.
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O & R No. 2 Fuel for glow-plug operated lapped piston engines. Class "A" and up only. Gal. $4.95.
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O & R No. 4 Fuel for glow-plug operated ring-type engines. Class "A" and up only. Gal. $4.95.
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KWIK-START *Glow Plugs*

Available for ALL leading engines

Designed by Harry T. Rice, these dependable plugs cannot develop a leak or short out through use. Only glow plug with very short thread (KS-5) designed for 1/5 A. Only glow plug with filament cavity shallow enough to be fully effective in ignition without being a detriment as a dead gas pocket. Special durable iridium filament! Ask your dealer for the O & R Kwik Start Glow Plug recommended for your engine. It costs no more!

65¢

Chemunol Corporation Rivera, California • Middleton, Delaware • Toronto: Canadian Hobbycraft Ltd.

Radio Control News

(*Continued from page 48*)

amplifies on 27.255mc.

If you're looking for a special transformer for transistor, or other work, check with Lafayette as to what they have in their Argonne line. These miniature and sub-miniature transformers come in 77 types and sell for $2.95 for any unit.

Clubs or super ambitious RC designers who want to see what can be done with etched wiring, can get a complete kit from Photo-Circuits Inc., Glen Cove, Long Island, N.Y. The main thing that struck our fancy in this $25.00 kit, is the ball point resist applicator. This applicator deposits an acid resist film which dries almost as soon as it hits the copper clad material. The quality of this kit is backed by the fact that the manufacturer is the world's leading producer of commercial and military printed wiring products.

Still on the subject of printed wiring, we'd like to mention some new kits and improved kits for this use, by Techniques, 178-84 Central Avenue, Hackensack, N.J. Mentioned in earlier columns, these kits are improved, all the way from the basic 'get-acquainted' kit for only $3.75, up through the Industrial Lab Kit for $27.00. If you want to go all the way, Techniques can supply more advanced kits. Supplies are also available.

Ever wonder how to make connections to some of those small mercury type cells? Then wonder no more, for Cambridge Themionic Corp, Cambridge, Mass. has two battery, or cell holders. The small one holds a Mallory RM-1R and the larger one will accomodate a Mallory TR-132R battery. These top quality cell and battery holders should be available through your local radio supply dealer who handles CTC products. Good battery connections help eliminate trouble between the power and the unit to be activated by them.

The Fairchild Guppy

(*Continued from page 26*)

should be used for proper matching. Use cardboard for this. When the hull is shaped and brought to a smooth finish, install the upper and lower housing, using block balsa specified, 1 1/2" x 2 1/2" x 26" upper, 2" x 3 1/2" x 22" for the lower lead-ballast housing. An honest effort should be made to create a super fit where these members join the hull. Use model airplane cement.

At the stern end of the boat, cut out four slots to the depth indicated. Into these cavities press and cement the four stationary control surfaces, again using hard wood. Prior to fastening, streamline these members as shown, then install. While drying, apply several coats of clear lacquer, followed with three coats of balsa sanding sealer. Incidentally, top off the hull with a balsa conning tower. Bear in mind that a light sanding with O-O paper is in order after each brushing of liquid. Allow the hull to dry thoroughly, then separate on the hatch parting line. Smooth the rough edges when the hatch is removed. Install on the port side a circular hatch as shown on the plans. Of course, this is a dummy-scale edition.

Since the hull is fashioned from hard wood, bolting the hatch to the main section is no problem. An aluminum crossbar is secured to the bottom side of the top section in the hull cavity. Two are required; use 1/4" x 1" stock. Drill and tap both bars, 1/4"-20. In line with these tapped holes, drill and counter drill in the hatch two holes to receive the hatch bolts. Use 1/4"-20 x 1 1/2" long Allen

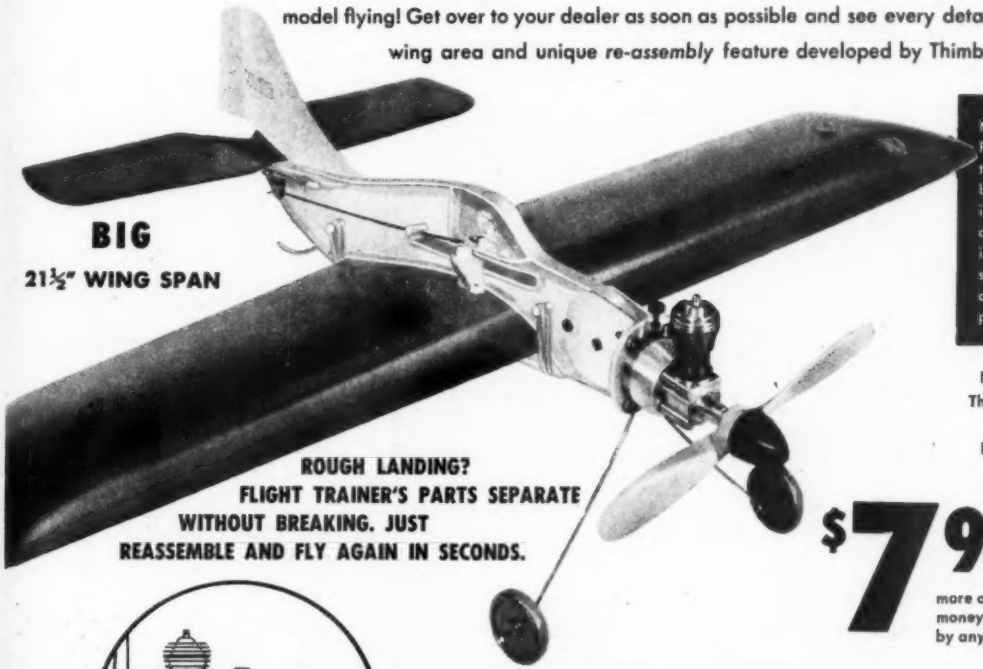
(*Continued on page 52*)

REVOLUTIONARY!

Want to get Dad in on the act? Show him this ad.

Thimble-Drome FLIGHT TRAINER

Now every modeler . . . from Junior to Pop to Grandad . . . can LEARN TO FLY better, quicker, *economically*. No hours of tedious construction only to see your precious handiwork wrecked in an early flight . . . no beautiful plastic job ballooning out of control and into a hazardous nose-dive! Now with *adjustable* thrust angle and other exclusive training plane features, FLIGHT TRAINER avoids those costly crackups, carries the beginner confidently from first flights up to and including stunt flying! It's the first plane specifically designed to TEACH the art of model flying! Get over to your dealer as soon as possible and see every detail, including the big wing area and unique *re-assembly* feature developed by Thimble Drome engineers



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21½" WING SPAN

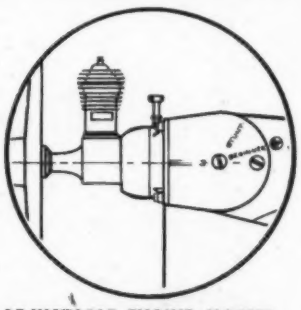
No screws—no glue. Plane is held securely together by rubber bands! Shock absorbing prop spinner even cushions nose-in landings. Entire plane constructed of new type almost indestructible plastic.

Equipped with all new Thimble Drome Babe Bee engine—powerful, INSTANT STARTING.

ROUGH LANDING?
FLIGHT TRAINER'S PARTS SEPARATE WITHOUT BREAKING. JUST REASSEMBLE AND FLY AGAIN IN SECONDS.

$7.95

more airplane for the money than ever offered by anyone.



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Power your plane, boat, and race car with a new
Thimble-Drome **babe bee .049**

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Designed for best performance with Thimble-Drome Fuel.

pint 95¢

A completely NEW engine, with NEW features ... 13 months in development ... extremely easy starting ... right or left hand rotation; all metal tank and carburetor unit; rear top needle valve position; right, left or bottom fuel pick up; no outside fuel lines; easily connected to timer or special tanks; on plane installation no holes necessary in fire wall.

See your dealer for complete line of World's Champion Thimble Drome Engines from **$3.95** to **$6.95.**

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The flying Partner of the Rapitrol Stick Box. Automatically Synchronizes with Stick Box.
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GOLD SEAL HAS IT!
Quicker starts, super performance, and the most in power output . . . that's what you get with GOLD SEAL whether flying your favorite model or testing new engines on the production line. Bill Atwood, noted designer and manufacturer of model engines, says, "In testing our new ½ A Shriek engines in the factory we use GOLD SEAL. We find that, due to its lubricating qualities, the engines maintain a constant, peak performance." So, — step up the performance of your engine — USE GOLD SEAL!
A FUEL FOR THOSE WHO WANT TO WIN
GOLD SEAL
2000 RACING
OHLSSON MANUFACTURING CO.
LONG BEACH, CALIF.
Not Connected with Ohlsson & Rice, Inc.

Head cap screws, with a rubber and metal washer beneath each. These are available at the local hardware store. Should the builder prefer, a hardwood cross bar can be used as called out in the plans. Merely sink a 1/4"-20 nut into the bar, and secure with cement.

Out next step is water proofing the hull, a subject not to be taken lightly. Need we say why? A V-groove is cut around the hull cavity, approximately diamond shape. Into this, cement a strip of rubber, 3/16" in dia. or 3/16" square. This will be a trial and error process until the hatch compresses the rubber seal and produces a water tight joint. To check for leaks, hand submerge the bolted-together hull in a tub full of water, watch for air bubbles.

The control surfaces are shaped from .035 sheet brass and soldered in place on two brass pivot rods. The rods pivot in brass bushings which are fastened to the extremities of the fixed surfaces. Before securing, drill a hole of suitable size to receive the prop shaft and packing gland. Use a standard kit with a 1/8" screw shaft. If you prefer, install a length of 3/16" I.D. brass tubing and machine your own shaft as called out in the plans. With a close-running fit no leak will occur. Once this is behind us, install the control surfaces as indicated above. Note that the horizontal control pivots forward of the vertical control. This is most important. Bear in mind the brass plates are soldered on the hull and not on the bench. Be certain they pivot freely.

To complete our first instalment, paint the hull below the water line a dark green, battleship gray above. Apply three coats of each color. Our second instalment will fit out the hull and describe operation of the radio gear. We will also complete the balance of the exterior hull trim.

Foreign Notes

(*Continued from page* 39)

the island of Mindanao in the Philippines. Member Tony Malferrari tells us that models are mainly built from U.S. kits but that some promising experiments have been made in the use of a local wood. American Atwood and Japanese Enya are the favored engines at the present time.

Sweden

One hundred and fifty competitors took part in the 1956 Swedish free-flight championships, held in good weather at Uppsala, near Stockholm. Events were A2 glider, FAI free-flight power and Wakefield rubber. Showings were well up to International standards. Rune Johansson of Norrkoping won the A2 with a total of 819 sec. Top man in power was Eskil Falk of Goteborg with 858 sec. and the Wakefield event was won by Ragnor Ahma with 861 sec. Swedish control-line and radio contests will be separate.

East Germany

A recent addition to our engine collection is a Schlosser .15 cu. in. Diesel from Eastern Germany. This is an orthodox shaft-valve, radial-port Diesel and, in this respect, similar to numerous other designs that have appeared in Europe during the past eight years. Most creditable, however, is the above average standards of finish seen on the engine. All machining is to a high standard and the excellent diecasting and very attractive sandblasted finish of the crankcase is particularly noteworthy. Cylinder porting is similar to the standard Arden layout except that three exhaust ports and six transfer grooves are employed. An unusual feature is the spinner, which screws onto a threaded

(*Continued on page* 54)

There's a precision-made x-acto tool for every Model Plane job!
For any model . . . flying, solid scale, glider, rubber, gas, jet, radio free flight, control line . . . X-acto tools put more skill at your fingertips. Designed by craftsmen and produced to quality standards, they help you to do better, faster, more professional work.
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Sanders • Spoke Shaves • Planers • Balsa Strippers • Knives • Hammers • Clamps • Pliers • Razor Saws • Files • Screw Drivers • Drills • Saws • Pin Vises. Singly and in sets, 10c to $30.
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JOHNSON ENGINES SET NEW RECORDS AT THE 1956 NATIONALS

. . . Out of Approximately Three Thousand Six Hundred (3,600) Engines Present, less than 20 were JOHNSON ENGINES . . . Yet JOHNSON ENGINES WON OVER 30% of the TROPHIES in Their Classes, which constitutes TWO TENTHS of One Percent (.2 of 1%) of the Total Engines Represented. Never before in the history of the Nationals has One Engine with so few Represented Won So Many Trophies.

• • • • • • HERE ARE A FEW OF THE JOHNSON WINNERS • • • • • • • • • • • •

DENNIS ALFORD, 13 Yrs.

1st . . . Jr. Stunt
1st . . . Jr. F.F. "B"
1st . . . Jr. F.F. "C"
1st . . . Jr. R.O.W.
Dennis is also the 1956 Calif Jr. Sweep Stakes Champion.

JOHN WERTS

1st . . . Sr. F.F. "C"
2nd . . . Sr. F.F. "B"
John is also the 1956 Calif. Grand Champion

JAMES IVEY, 14 Yrs. Old

2nd . . . Jr. Stunt
Jimmy is also the 1956 Calif. Jr. Stunt Champ.

DICK McGRATH

1st . . . Open F.F. "B" with Hi-Time at the Nat's. (28.53 Min.)

• JOHNSON .35

• JOHN WERTS'S JOHNSON ENGINE already had Over 250 Hours on it before he Won the 1st in Sr. Free-Flight "C" at the 1956 Nationals . . . which is One of the Many reasons JOHNSON ENGINES Are The Only Engines GUARANTEED for ONE YEAR

Watch for the New JOHNSON STUNT ENGINE

The HARDNESS of the New JOHNSON CYLINDER was the Topic of the 1956 Nationals

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Kelly Thomas	Lee Hines	Ralph Ray	Ronald St Jean
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• Lew Mahlew and Dennis Alford using JOHNSON ENGINES Established TWO NEW NATIONAL R.O.W. (Rise-off-Water) Records, where Brute Power is a Big Factor. (These records have not as yet been confirmed, but the applications are in.) See Your Dealer Today and Buy a JOHNSON.

Dynamic Models, Inc.
Dynamic Models, Inc.
1205 E. Ash Ave., Fullerton, Calif.

Engine Review

(*Continued from page* 49)

Since air is a free and unlimited source of oxygen it is universally used as such in engines, but when one reflects that only a little more than twenty percent of the air pulled into the engine consists of oxygen, and that most of the rest is nitrogen which passes through unchanged and unused in any way, except as a cooling agent, it is obvious that a lot more air has to be pulled in to get a little more power. If the engine starts out by pulling in air polluted with exhaust gases consisting of nitrogen, carbon dioxide, water and a little carbon monoxide, it has very little oxygen with which to burn its fuel, and consequently cannot produce much power. Therefore, the most elementary way of guaranteeing good engine performance is to ensure that the air intake is always in a position to induce cool clean air. A little reflection upon the cowling of model engines will convince you of how seldom this requirement is met. When an engine is badly cowled, the use of nitro fuels will always effect a very marked increase in power, simply because nitro provides oxygen. Were that engine cowled properly much of the increase would be there already and the extra urge from nitro might well add on to give even more power.

The Mariner kit therefore includes several inches of the correct bore hose with which to extend the intake out to a source of clean air, and the exhaust can therefore blow out into the engine compartment without hindering engine operation. Obviously it would be nice, if only in the interests of cleanliness, to duct the exhaust to the outside of the boat as well, and no doubt many users will devise a means of doing so, but to include the necessary equipment with the Mariner kit would have entailed a very considerable increase in cost. As it stands the unit will operate at full power without this provision.

In describing the .049 Midjet engine previously, the observation was made that there appeared to have been a change of plan in the design of the reed valve. From the original petal type of valve, a change had been made to an annular type, which flexed in two semicircles, is retained by tiny rivets at the two extremes of the horizontal center line in the plane of the valve. Subsequently, the manufacturer explained that this was done to leave the center of the rear cover clear to receive a rear drive for a marine unit, and that, although the petal valve had proved highly successful, a marine adaptation would have been very difficult to produce at a similar price. The annular valve gave the same performance and so became the logical choice.

Having now seen and tested the Mariner, it would be hard to visualize a neater and more efficient layout. The rear drive shaft has a disc with a hole which registers with the crankpin. Behind the disc is a shoulder which gives controlled clearance for the valve and mixture passage, and then the shaft enters a bearing in the valve seat. Behind this bearing is the induction chest through which the shaft passes to its rear bearing behind the vertical intake. Just above the shaft, inside the induction chest, is the spraybar and jet hole from which fuel is passing over the shaft and providing the best possible lubrication at all times.

Good ideas abound in this engine and there is not a single feature which has not been thoroughly thought out and proven. The flywheel is splined to the shaft so that there is no possibility of that often undetected cause of lost power from flywheel

(*Continued on page* 64)

CLEVELAND

"The Models the Men in the Air Forces Build"

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¾" Scale Kits To Build Models Of Historic Airplanes

These are the same World Famous Cleveland Designed "SP" Master Kits you have heard so much about, made up the same as they were in the past. Kits include: authentic full size wall detailed plans, printed cut (not diecut) parts on balsawood, Stripwood, special blocks, tissue, wire, wheels, label insignia, etc. (No cement, dopes or rubber bands included)

¾" SCALE "SP" SERIES KITS

No.	NAME AND WHO SPAN	Price
SP-15	'17 Fokker D7 W.W.I Fighter 21-1/4"	3.25
SP-17	'31 Lowell Boyles "Gadfly" T.T. Racer 17-3/4"	4.50
SP-18	Howard's "Pete" No. 37 Racer 18"	2.95
SP-21	Army Curtiss "Hawk" P6-E Biplane 23-5/8"	4.95
SP-66	'30 Laird "Solution" T.T. Racer 15-7/8"	3.50
SP-67	'33 Weddell's Weddell-Wms T.T. Racer 19-1/2"	3.95
SP-69	'32 Curtiss F11C-2 "Goshawk" Biplane 23-5/8"	3.95
SP-82	'35 "Mr. Mulligan" T.T. Racer 23-1/2"	4.50
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SP-115	Douglas A-20 "Havoc" Attack Bomber 44"	10.95
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FOR BETTER PERFORMANCE!
• HARD RUST PROOF BRASS • GUARANTEED AGAINST LEAKAGE
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MOUNTING STRAP INCLUDED WITH EVERY TANK

TYPE "U" STUNT OR SPORT
98¢
"U"-1 1½" 2¼ ounce
"U"-2 2" 3 "
"U"-3 2½" 3¾ "
"U"-4 3" 4½ "
"U"-5 3½" 5¼ "
"U"-6 4" 6 "
"U"-7 4½" 6¾ "
CROSS SECTION SIZE 1¼" x 2-1/16"

TYPE "B" STUNT OR SPORT
CROSS SECTION SIZE 1-1/16" x 1½"
79¢
"B"-1 1½" 1 ounce
"B"-2 2¼" 1½ "
"B"-3 3" 2 "
"B"-4 3½" 2¼ "
"B"-5 4" 2½ "

TYPE "C" TEAM RACER SPORT OR BOAT
CROSS SECTION SIZE ⅞" x ¾"
69¢
"C"-1 1-5/16 ½ ounce
"C"-2 2-9/16 1 "

TYPE "F" STUNT OR SPORT
CROSS SECTION SIZE 9/16" x ⅜"
49¢
"F"-2 1" ⅛ ounce
"F"-3 1½" 3/16 "
"F"-4 2" ¼ "
"F"-5 2½" 5/16 "

TYPE "R"—RADIO CONTROL
CROSS SECTION SIZE ⅞" x ⅞"
75¢
"R"-1 1½" ½ oz (ONE SPEED)
"R"-2 2" ¾ "
"R"-3 2½" 1 "
"R"-4 1½" ½ oz (TWO SPEED)
"R"-5 2" ¾ "
"R"-6 2½" 1 "
85¢
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BR-3

AMERICA'S FINEST LOW PRICED SENSITIVE RELAY

The BR-3 is the last word in *low priced* sensitive relays. Using a balanced armature, the BR-3 may be mounted in any position and perform with *extreme sensitivity and reliability*; also its extremely small size permits use in places where other designs could not be used. Only the *finest materials* are used.

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- All metal parts are plated — Molded plastic coil forms.
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- Supplied in resistance ranges to 5000 ohms and as sensitive or power type.
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$4.95

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Foreign Notes

(*Continued from page 52*)

periphery on the prop retaining washer. The motor weighs 3.8 oz.

Red China

All in all, after examining detailed results sheets, China's showing in the free-flight events in the Russian sponsored 7-nation M.M.S. international meet for 1956, was not at all bad.

In the glider event, for example, Siu Min-hsien placed third with 740 secs, winner's time being 849 and lowest time 507. In free-flight gas, Liu Ming-tao clocked 876 for third place only 24 seconds behind winner Cerny of Czechoslovakia. Model was a VTO pylon job. In the Wakefield rubber event, the Chinese contestant's placing was somewhat lower down the list at fifth position—not surprising in view of the fact that he was up against such masters as Cizek of Czechoslovakia, Matvejev of the U.S.S.R. and Benedek of Hungary. Only in the two control-line events did the Chinese lose points seriously, resulting in their eventual team placing of 7th.

West Germany

New name in Western Germany is that of "Star Models", a rapidly expanding kit and engine organization under the command of Eric Spivey, formerly of Webra. Kits range from chuck gliders upwards. Designers include such famous names as Karl-Heinz Denzin and Oskar Czepa. First Star engine is a .03 cu. in. Diesel on which we shall be reporting later.

Finland

The help given by American business interests—notably PAA—in sponsoring international model events is keenly appreciated by overseas modelers. A further boost came recently with the sponsorship by Chrysler's Plymouth Division of the Finnish meet at Helsinki. Most types of events were featured.

Italy

To settle any doubts regarding the displacement of the Super-tigre G.21(35): Early models had 19.5 x 18 mm. bore and stroke, giving 5.235 c.c. or just under .32 cu. in. Later versions however, and all those being imported into the U.S.A., have a 20 mm. bore, giving a swept volumn of 5.655 c.c. or .345 cu. in.

Experiments with Transistors

(*Continued from page 21*)

in a tone receiver.

It was possible to increase the gain of the audio amplifier (Fig. 4), by adding a third transistor with an audio filter. This audio filter has the same resonant frequency as the tone being transmitted, so it will only respond to that tone. If attempt is made to add an extra stage of audio amplification without this filter, the amplifier is bound to break into oscillation.

The big factor that led to a practical receiver and transmitter that can be used by any RC builder, was the change to a higher frequency. By using a frequency in the 220 mc. ham band or the 465 MC citizens band, it is possible to utilize the proper RF current distribution in a quarter wave length receiving antenna to make a more efficient diode detector circuit (Fig 5). You will notice that the diode is connected a short distance from the point of maximum RF current. The impedence at this point should match the impedence of the diode. The impedence of the diode, which is a non-linear element, is determined by the current passing

(*Continued on page 56*)

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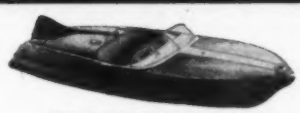

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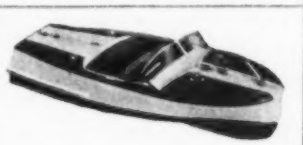

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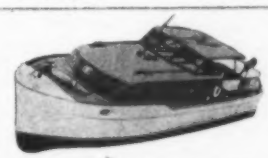

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through it. This current is regulated by resistor R1. The impedence of the diode in turn should match the input of transistor TR1. When these conditions are met, a maximum power transfer from the antenna to the audio amplifier will result.

By using 465 MC it is possible to obtain gain in the transmitting antenna. Gain in a transmitting antenna means that more energy is radiated in a particular direction than would be radiated from a simple whip or dipole antenna in the same direction. This gain can be compared to a flashlight focused on a distant object. Without the reflector in the flashlight, the amount of light reaching the object would be much less.

There is one drawback to using the 465 mc. Citizens Band. The transmitter must be FCC approved, and approval is only given to a transmitter that will be made commercially. This means that you cannot legally make your own transmitter like you did on 27.255 mc. There are two ways out. You can buy a commercial 465 mc transmitter that has been approved by the FCC. There is available from Vocaline Corp of America, a trans-

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ceiver that operates on 465 MC. By making a simple transistorized tone oscillator that plugs into the microphone jack of the transceiver you're all set to operate on 465 mc. This equipment can operate from an AC outlet, a car battery, or a portable 6-Volt hotshot dry battery. Remember that this transmitter does not have a directional antenna so that the range will not be anywhere near that of a transmitter with a director and reflector.

A good idea would be to obtain an amateur technician class license or work with a ham in constructing a transmitter for either the 220 mc. or 420 mc. band. My best results were obtained on 220 mc. There is a large selection of transmitting tubes for this frequency and the transmitter efficiency is higher. The size of the antenna system is about twice the size of that for 420 mc. but it is still convenient to handle. Anyone who desires to build a transmitter for either of these frequencies can get schematics of modulators and transmitters from the Radio Amateur Handbook.

The circuit shown in Fig. 4 has sufficient sensitivity to operate in a model plane a quarter mile from the transmitter shown in the photograph. By using an antenna with a reflector and director, it is possible to increase this range to a mile.

Let me caution you to some of the pitfalls in the construction of this type receiver. Several of the components must be selected by operational tests to make the receiver work most efficiently. These components are resistors R1, R2, R4, R7 and the audio filter L1, C7. The point at which the 1N172 diode is soldered to the tank coil must be determined by a sensitivity test. The leads of this diode and capacitor C1 should be kept as short as possible. When soldering to a diode (or transistor)

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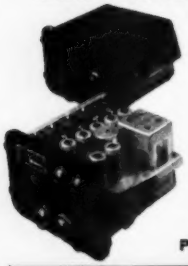

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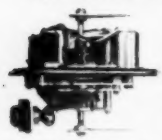

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with short leads you should hold a pair of long-nose pliers between the diode and the joint being soldered, to keep excessive heat from burning out the diode. Resistor R1 is determined by an actual field test. A value should be selected that gives maximum sensitivity. This value is not critical but will vary the individual diode used. The correct values for resistors R2 and R4 are determined by replacing each one in turn with a 1-megohm variable resistor. Adjust the variable resistor for maximum audio signal at the output of transistor TR2, then substitute a fixed resistor with a value within plus or minus 20 percent of the resistance just determined. Resistor R7 can be determined by substituting a 1-megohm variable resistor in its place. Adjust the variable resistor to the point where the escapement drops out. Substitute a fixed resistor with a value within plus or minus 10 percent of the resistance just determined. The audio filter L1, C7 depends on the tone frequency of the transmitter. A typical filter for 3KC might have an inductance of .5 henry and a capacitor of .005 uf. For a given frequency the product of inductance and capacitance is fixed. This means that for a 3KC filter you could also use the combination of .05 henry and .05 uf.; or .005 henry and .5 uf. By using a small inductance with a large capacitor the output voltage from the filter will be reduced. If you use a large inductance with a small capacitor, the filter will respond to noise and unwanted frequencies. So you see that the electrical size of the inductor cannot be reduced to make a small receiver. By using a torroidal inductor it is possible to get even a 1 henry inductance of reasonable size for this type of receiver.

The circuit that is shown in Fig 4 uses a medium-power transistor to operate the escapement. The escapement used has a coil resistance of 75 Ohms, so that when used in this circuit with a 6-Volt input, the battery drain is only 80 milliamps. It is made with two coils of no. 32 enamelled copper wire wound on ¾" dia. x ¾" long iron rivets. The weight of this escapement is four ounces, but the reduced battery drain and extremely reliable operation make the extra weight worthwhile. Remember that the larger the coil, the greater the electrical efficiency possible.

At present I do not have data for using a power transistor to drive any of the commercially available escapements. If you want to use one of these escapements, I would suggest that you use a relay for the output of the receiver, as shown in Fig. 3, so that any type actuator can be used.

You will notice that a switch is not shown in the schematic for the 465 MC receiver. This is possible because the receiver can be left on for several hours without running down the batteries. The method that is used to disconnect the batteries when the receiver is not being used for long periods of times is to insert a blank plug into the meter jack, thereby breaking the battery circuit.

The meter jack also serves its intended function which is to allow a milliameter to be inserted in the battery circuit to measure the total current for tuning purposes. The frequency adjustment should be made with a weak signal because the receiver has broad band response when close to the transmitter. In order to save yourself the trouble of walking the receiver out to its maximum range for tuning purposes, it is possible to position the receiver at a signal null. A null can be located by placing the receiver between the trans-

(*Continued on page 62*)

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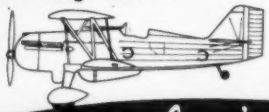

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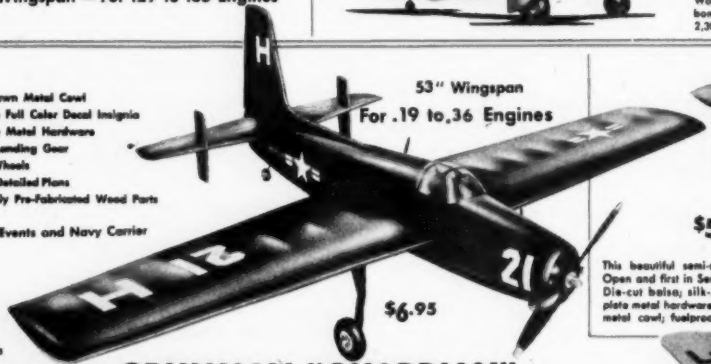

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For .14 to .29 Engines — 33" Wingspan 1" Scale

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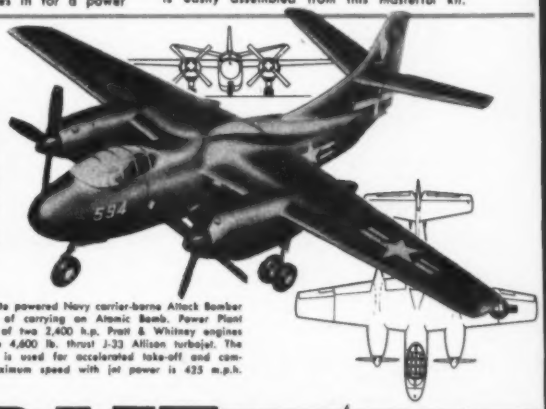

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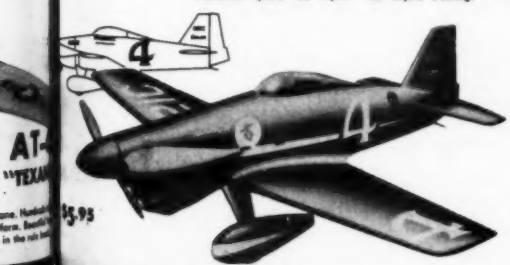
.14 to .36 Engines — 28" Wingspan

This Continental Trophy winner makes a perfect controline kit includes metal hardware; formed metal wheel pants; metal spinner; formed sheet metal landing gear; metal bushed rubber wheels; die-cut balsa; plastic bubble canopy; fuelproof decals; hardwood mounts; die-cut plywood; covering material; full size detailed plans.



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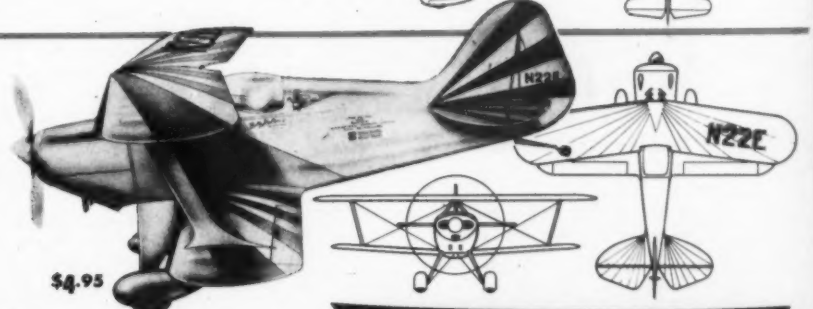

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mitter and an object that will reflect a UHF signal, such as a car. The transmitter should be walked out about 100 yards and directed away from the receiver. With the receiver about a foot or two from the reflecting object, move the receiver around till you lose the signal. This is a null. Hold the receiver steady and tune for maximum current. Do not hold the receiver closer than 6 inches from a metal surface, because it will detune the receiver.

To make a quick check of the battery voltage you can plug a voltmeter into the meter jack. There will be a slight inaccuracy due to the resistance of the meter, but you can get an indication of when the battery voltage is dropping. I definitely do not recommend mercury batteries because they will give a full voltage reading up to their end of life and then drop off sharply. It can be very disturbing if the batteries go bad during a flight.

The 25th Nationals

(*Continued from page* 11)

a precision stunt show they will never forget.

Dallas paper tells flier he is in second place: Tom Killough, a hot Texas free flighter, lives across town in Dallas. He drove out to the meet each morning to compete. Having placed no better than several 5th places for three days of flying, Tom had figured he was out of the show for Champion. Tom was sleeping late on Thursday, to be awakened by his brother to read a subline in the Dallas Morning News. It read: KILLOUGH SECOND TO BLANCHARD IN CHAMPIONSHIP MEET. With new enthusiasm, this Texas flier tried to turn on the heat to catch the pace setter. Blanchard's good flying and more 5th places for Killough netted him 3rd in line for championship. This shows that it is possible for a modeler to be National Champion and yet never receive an event trophy on awards night. Texas Tom almost did it.

Hydro event growing in popularity: On seaplane day, it seemed that every free flighter had floats for his ships. They ranged from smooth streamlined pontoons to seemingly shoe-boxes and cola caps. Tom Killough had the best looking free flight of the entire meet on floats at the man-made Navy pool. Killough's ship was a non-kit Civy Boy 61 that was rubbed and waxed to perfection. This guy constantly had an admiring crowd around his models. Could have won the Testor beauty event, had he entered. Lew Mahieu had a hot cooking all-black-and-shiny Kiwi at the mud-hole with a new Johnson that screamed him into a close second place.

Bilgri indoor master at Fort Worth: Literally hundreds of hand-launch gliders were chucked indoors at the Will Rogers Auditorium in Forth Worth. Bob Hanford, Dallas, did an amazing 1:02 glider flight in the low ceiling arena. Bob's glider was a big thing that rolled out over the girders. Joe Bilgri proves year after year that he is the micro and paper-covered man to beat. This year Joe turned in three firsts in indoor.

Speed models faster than ever: Eight new control line speed records were set on the hot and humid Dallas N.A.S. runways. Most of the models were of the Clem-Beasley-Kirn clean-type monoline designs. Bill Wisniewski, James Paysen, and Phillip Bussell were the speed stars. The famous fliers Clem-Beasley-Kirn turned event directors to help the speed boys.

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The helio event is growing with interest. Parnell Schoenky, the 'copter master, rang up top points over a more competitive field than in the past. Most of the choppers were half A powered. Ray Van de Walker, Long Beach modeler, entered a Torpedo 15 powered 'copter that traveled upstairs like an atomic-powered escalator . . . right out of sight too.

Combat ships were armor plated: It seems a new trend is here in combating. No longer do the boys build the quick and flimsy combaters. They are building fibreglass and Pliobond cemented monsters that can collide with a sack of bricks and still fly. Some of the ships we saw were built like tanks. These combat fliers look at each other with a wry grin, as if to say: "My ship is stronger than yours . . . so down you go." Next year these fierce fighters will probably have moly hack saw blades molded in the edge of a fibreglass wing . . . Gr-rrrr.

Spectators thrilled with Navy's carrier event: Next to Control line Scale, the most beautiful models were entered in the Navy Carrier Event. This event was held in front of the main hangar, and on Sunday thousands of spectators jammed about the circle to see Solomon J. Train of East Meadow, Long Island, fly aboard the U.S.S. Dallas with a near perfect hook-up, after sizzling speed laps. Doc Martin, Houston, Texas, entered a big twin-engine carrier model that had a Dynajet honking in the fuselage.

PAA events sets new world record: We were happy to see PAAload pappy Dallas Sherman at the big meet. He and the popular George Gordner worked overtime to see that the PAA events kept moving. Jetex PAAload was interesting, especially to see F. L. Swaney clock 5:47 with practically a hand-launch glider a la Jetex and dummy. Woody Blanchard set a new Cargo lift of 43½ ounces. Sal Taibi won the International PAA event with the high time of 15:00.

Beautiful B-36 bomber wins ukie scale: Imagine six Torp 19 engines (inverted at that) and two Jetex 350 engines in a perfectly constucted 8 foot B-36. Built by Capt. Richard Morehead of the Air Force team, this big ship came in first by making an official flight on five of the engines. Tom Dean was a close second with his famous single-engine Aeronca Duster. Jimmy McCroskey had a bad landing in the senior event, skinning some pretty silver finish off his P-51 Mustang . . still placed first.

Thousands of visitors see and enjoy Nationals: On the last two days of the big meet, Saturday and Sunday, the public was invited to see the show. They came in droves. At 2 o'clock, both days, the flying stopped while the Navy's famous Blue Angels went through amazing close formation flying. Added to this was a spectacular fly-by of all the Navy's new planes, including the sleek new Chance Vought Crusader. After the air show, the Navy's guest of honor, Vice Admiral T. S. Combs, presented the Grand National Champion award to Williard S. Blanchard Jr. Then at last an auditorium full of tired, sun-burned, but happy modelers marched to the stage to receive their awards. Gorgeous trophies they were . . . black wood with white grain and a mountain of flashy gold "goodies" on top.

The U. S. Navy . . The modelers' perfect host: On my way home to California, a bit frazzled and sunbaked, I kept thinking about the intense interest and activity of the fore-gone week. We knew we had just closed the gate on the finest National model meet of our time.

Appreciation to Captain D. A. Sooy,

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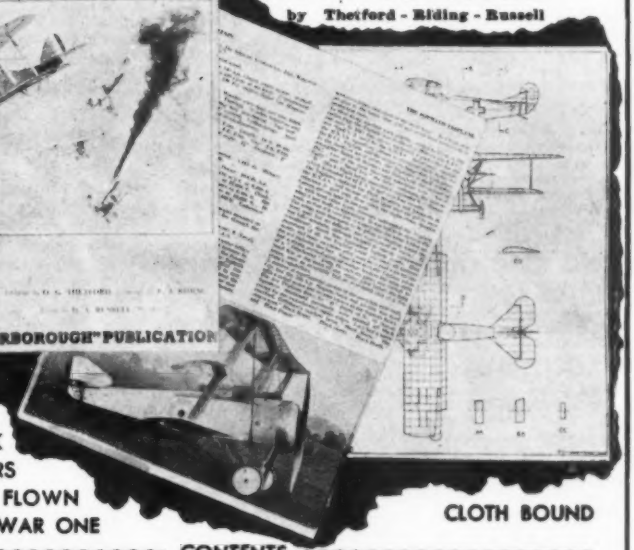

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(Painting shown at right)

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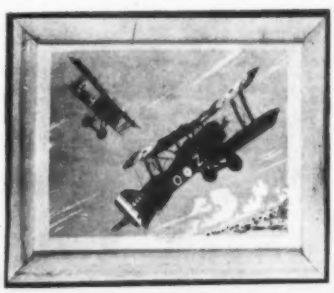

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Engine Review

(*Continued from page 53*)

slip. The highly efficient "focal porting" definitely gives a cleaner running engine as claimed, and the range of speeds over which the engine will two-stroke is quite remarkable. The unit is exceptionally compact while having bigger bearings than most engines of its size. This is achieved by recessing the flywheel so that it extends back over the main bearing, and by a very small volume crankcase with the power take-off shaft extending deep inside. The overall height from the bottom of the crankcase is only 1¾". The stainless steel propeller shaft terminates in a point which serves as a spinner for the very neat and efficient beryllium bronze propeller which is staked onto the shaft in such a manner that it will slip upon impact. The same material is used for the shaft support strut which has a very thin web to preserve prop efficiency. Both parts are gold plated, as also is the shaft stuffing box which features a neoprene seal. The rudder assembly which is also gold plated consists of three parts: the rudder itself which is correctly proportioned for the prop, the rudder bushing and neoprene seal which is tight enough to hold the rudder in position, and the tiller bar.

There is no doubt that this sets a new standard in quality, appearance, value and performance in inboard marine engines and is yet another illustration of how efficient the model industry has become.

Tissue Stick

(*Continued from page 22*)

cement. Apply paper cement only to the center rib, to the leading and trailing edges and to the rib at the dihedral break. Lap the tissue of one side about 1/16" over the other at the center rib. The outer panels are covered in about the same way. Apply tissue cement to the rib at the dihedral break, to the leading and trailing edges, and to the 1/32" square tips. After the tissue cement is dry, trim off the excess tissue using a sharp razor blade.

The elevator is built in the same way as the wing, only no dihedral is used and therefore it can be covered in one piece instead of in separate panels. The rudder is bent in the same manner as the wing tips and is made in two upper and lower halves which are carefully spliced together. Add a 1/32" square rib and cover the rudder with tissue.

Wing clip sticks are 1/16" square medium balsa and the clips themselves are made from .020" thick aluminum 1/32" wide and shaped to fit over the motor stick. The metal clips should overlap the wood wing clip sticks about 3/16" at the bottom. Two 1/32" square diagonal braces are added to each wing clip stick as shown in the drawing. These give some additional rigidity to the wing.

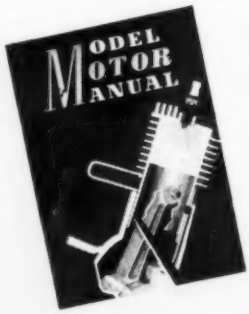
Assemble the elevator and rudder to the tail boom, being very careful to maintain alinement of both pieces. Set the rudder about 1/4" to the left as shown in the drawing to give the plane a left circle.

The propeller may be made in either of two ways. It may be carved from a soft balsa block 1" x 1 1/2" x 13", or it can be made from two 1/32" thick balsa blades and steamed to the correct pitch. When carving, carefully sandpaper the prop using fine sandpaper and be sure to make the *back* of the blades about 1/16" concave. The prop blades should taper from 3/64" thick at the center to 1/64" thick at the tips. To make the simple, two-piece prop, cut two blades from 1/32" soft balsa, as shown in the pattern. Overlap the centers about 5/16" and cement in place. When dry, sand the blades thinner toward the tips, making them about 1/64" thick. Then steam the blades to correct pitch, using the steam from the spout of a tea kettle. Be careful, steam will burn fingers very easily.

Propeller pitch is correct when the blade angle about half way out on each blade is 45° to the hub. Add a .016" wire prop shaft and two small washers. The plane is powered with a 13" loop of 3/32" brown rubber. For trial flights, use only about 500 turns in the rubber motor which has been lubricated with lanolin or a green soap-and-glycerine lubricant. The plane should climb slowly in about 50-foot diameter circles to the left. If the wing flutters or washes out, bend the aluminum wing clip on the rear of the wing *toward* the wing that washed out. A few trials should soon have the plane flying very well. After the plane is adjusted, give the rubber motor about 1600 turns and prepare for a fairly long wait for it to come down.

The same basic design was used by Brent to win the microfilm-covered Indoor Stick Event, and to place second in paper-covered at the 1956 Nats, Dallas, Texas, helping him win the Junior National Championship. Wing spars were oval. Motor-stick and tail boom were made of 1/64" quarter-grained balsa (Jem supplies used throughout).

The plane used by Brent, when he was 7 years old, to place fifth in Indoor Stick in an earlier Nats, was published in the July 1953 issue of Model Airplane News. The writer also designed that model by Brent, who does the building and flying



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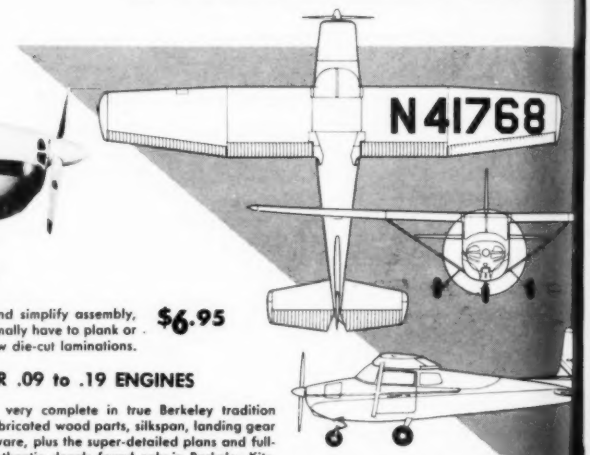

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